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Today and  
Tomorrow

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For years, physicians specializing on school ventilation problems have recognized certain faults in all ventilating systems. These systems were based on principles which have been proved partly erroneous.

What are these erroneous principles? What are the latest proved principles of ventilation? What problems do they involve? How will school ventilating practice of the future differ from practice of the past? These are some of the questions answered in the booklet, "School Ventilating Practice—Yesterday, Today and Tomorrow."

This booklet has been enthusiastically received by ventilating specialists in all parts of the country. It is an authentic presentation of the school ventilating problem—frankly written.

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# American Journal of Public Health

## And The Nation's Health

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Volume XXII

January, 1932

Number

Stabilized Schick Toxin

MOLONEY and TAYLOR

Toxoid Immunization

PARK and SCHRODER

HARRISON

FITZGERALD, DEFRIES, FRASER,

MOLONEY and McKINNON

POVITZKY

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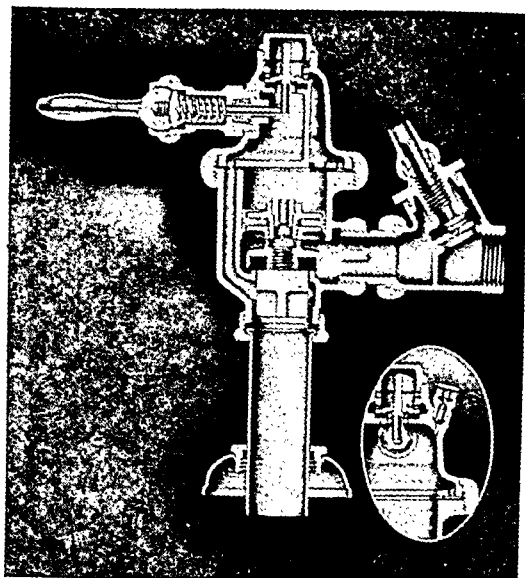
# Again Crane *leads the field*

THE American Society of Sanitary Engineers issue a warning of danger in the use of plumbing fixtures which permit the possibility of water pollution through back-siphonage of waste into the water supply system. At a meeting recently held in Washington, D. C., committees were appointed to devise ways and means of protecting the populace against this danger.

Several years ago it was observed by noted health authorities in some of the country's most famous hospitals, in spite of all precautions, post-operative infections were occurring and water-borne diseases were spreading. Crane Co. collaborated with medical authorities, and their engineers set out to learn the cause and devise a remedy.

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# A Basis of Rationing for Federal Prisoners<sup>\*</sup>

PAUL E. HOWE, PH. D., AND A. H. MACCORMICK

*Senior Biological Chemist, U. S. Department of Agriculture; and Assistant Director, Bureau of Prisons, U. S. Department of Justice, Washington, D. C.*

A BASIS for determining the cost of food and a measure of the adequacy or inadequacy of the diets were found to be necessary for the economical, satisfactory and adequate feeding of the inmates of federal prisons or reformatories. Such a basis must be applicable to the average inmate, irrespective of the type of his work, on the assumption that the variation in activity is covered by the variation in appetite.

To determine a basis of rationing, two main courses of procedure were open: (1) to accept data already in existence as to what constitutes an adequate diet with regard to kind and to quantities of foods to be fed; and (2) to determine the amounts and kinds of food used in the various prisons, under conditions that were reasonably effective from the point of view of preparation and distribution, and satisfaction under the restricted conditions that exist in a prison, and finally to modify the result so obtained with regard to dietary requirements as dictated by present-day knowledge of nutrition. We adopted the latter as one that would give assurance of success when modifications were introduced. Furthermore, such a procedure enabled us to evaluate the operations of prisons under existing conditions and furnished a basis for judging the effects of future changes.

Data were assembled over a period of a year from 5 federal institutions having a total average daily population of about 10,000 men: the penitentiaries at Atlanta, Leavenworth, Fort Leavenworth, and McNeil Island, and the reformatory for men at Chillicothe. These data represented the ordinary operation of prisons, with a tendency to modification in the direction of an increased consumption of vegetables and in some cases considerable variations in the consumption of milk, due to advice to the stewards or variations in farm practices.

The foods were subdivided into type groups. The consumption

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<sup>\*</sup> Read before the Food, Drugs and Nutrition Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 14, 1931.

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Official Monthly Publication of the American Public Health Association

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# INDUSTRIAL HYGIENE

**Cyanide Poisoning**—The most important industrial forms of cyanide are hydrocyanic acid and the sodium and potassium salts of this substance, NaCN and KCN. Hydrocyanic acid is a volatile liquid, both aqueous and alcoholic solutions decompose spontaneously. The salts are crystalline in nature; in solution they decompose, when heated above 176° F., or when they are acted upon by acids, and in decomposing they give off cyanide vapors. These compounds are used in industry for the extraction of gold and silver, for electroplating, and in certain metal cleaning polishes.

Poisoning occurs by skin absorption, by inhalation of the gas and inhalation and ingestion of the crystalline compounds. The cyanides exert a peculiar asphyxiating action on the cells of the body. So completely and rapidly are the latter deprived of their ability to utilize oxygen that injury or death may ensue very rapidly. Cyanide rash often follows the use of these compounds in industry.

Contrary to the belief held by many physicians, cyanide may produce chronic as well as acute poisoning. In the present contribution brief abstracts are presented of 3 cases of chronic cyanide poisoning taken from the files of the Division of Industrial Hygiene of the New York State Department of Labor.

The immediate effects in the first case were nausea, dizziness and unconsciousness, followed during the next 6 weeks by weakness and palpitation, with incapacitation for work.

The second case is that of a gold plater, with an occupational history of 20 years' duration. He made up a large supply of KCN solution one day; that evening he developed severe abdominal

pains and convulsions and later developed persistent vomiting. This man was forced to give up his work; he lost 20 pounds in weight, and was incapacitated by weakness, headache, dizziness, muscular cramps, and recurring attacks of abdominal pain and vomiting.

In the third case the physician who examined the victim 3 years after the onset of symptoms found him entirely disabled with paralysis and wasting of the muscles of the arms and legs.—Adelaide Ross Smith, M.D., *Indust. Bull.*, 11, 6: 169 (Mar.), 1932. L. G.

**Procedure for Establishing Optimum Air Conditions for Light and Heavy Work**—The present contribution deals with the study of atmospheric conditions lying in that range between the optimum comfort zone on the lower side and the onset of disturbance in the heat regulating apparatus on the upper border. This zone is not characterized by any pathological manifestations, but nevertheless discomfort and fatigue causing a reduction in working output may be present.

The authors point out that according to the data of Hill the optimum temperatures for certain workers are exceedingly low, for example,  $-21^{\circ}$  C. for a stone mason and  $-31\frac{1}{2}^{\circ}$  C. for a man sawing wood. Obviously such temperatures cannot be proposed as practical optimums. In addition they point out that under certain conditions of air currents, the kata thermometer of Hill does not yield reliable estimates of the cooling power. The effective temperature index determined from sensation is applicable to Americans at rest or engaged in light physical work. No data are presented for heavy physical labor.

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cases, but in a much milder degree than that present in the earlier group of cases.

In the early cases mesothorium predominated while in the later cases radium has been detected in the postmortem examinations. It would appear, then, contrary to the belief of certain persons, that radium as well as mesothorium is responsible for the production of pathology. The bone lesions in these later cases was found to be osteogenic sarcoma, and Dr. Martland states:

It would now appear that we have reached a point when we will no longer encounter the anemias and jaw necroses seen in the earlier cases, but instead the girls will appear with terrible, usually rapidly growing, embryonal or anaplastic osteogenic sarcomas, the result of radioactivity.

Previous autopsies disclose the fact that the lethal amount of radioactive substances in the skeletons of deceased persons varied between 10 to 180 micrograms. The rays emitted by such deposits consist of 92 per cent alpha rays and 8 per cent beta and gamma rays. These alpha rays are said to be the most potent and destructive agent known to science. Mesothorium emits 5 particles as compared to 4 emitted by radium. It is interesting to note that the 10 micrograms, that is, 1/100,000 gram, is sufficient to produce death, and yet this quantity is so small as to be invisible and undetectable by any known chemical method of analysis.

An interesting discussion of the incidence of carcinoma of the lung in cobalt and pitchblende miners is presented. A few years ago a study of 154 miners was made using modern diagnostic methods. During a period of 3½ years, 21 of the miners died and in 13 cases (62 per cent) a diagnosis of carcinoma of the lung was made at autopsy. The belief is now held that radioactive emanations are the causative factors in the production of these cases of lung cancer. It is true that the concentration of radium emanations in these mines is quite low,

nevertheless the exposure is of long duration, 20 to 30 years prior to the development of the tumors.

The author of this valuable contribution issues a warning against the use of radioactive drinking water.—*Month. Labor Rev.*, U. S. Department of Labor. 34, 4 (Apr.), 1932. Abstr. from The Occurrence of Malignancy in Radioactive Persons—Harrison S. Martland, *Am. J. Cancer*, Oct., 1931. L. G.

**Cadmium Poisoning:** 1. The History of Cadmium Poisoning and Uses of Cadmium—This contribution presents a very valuable summary of the physiologic and pharmacologic action of cadmium. Reviewing the literature in a very complete manner the author concludes that cadmium is relatively toxic for laboratory animals and that it possesses a direct paralyzing action on the central nervous and vasomotor systems. This material has a tendency to be stored chiefly in the liver and kidneys, and elimination, which is very slow, is effected through the kidneys and gastrointestinal tract.

In the second portion of this paper, cadmium poisoning in man is reviewed, and a discussion of the chemistry and industrial uses of cadmium is presented. Finally a list of the health hazards associated with the use of cadmium closes this interesting report.—Leon Prodan, *J. Indus. Hyg.*, 14, 4 (Apr.), 1932.

L. G.

**Japanese Association of Industrial Hygiene**—The Fourth Annual Meeting of the Japanese Association of Industrial Hygiene was held in the city of Nagoya November 14–19, 1931.

The subjects covered were the influence of gymnastic exercises on the health of industrial workers, the organization of factory clinics, health insurance and medical practitioners, high temperatures and humidity in spinning mills, the protection of women in pregnancy and after



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of carrots, to a cow at the end of the winter stall feeding period resulted in an increase not only in the carotene content but also in the vitamin A content of the butter-fat.

3. The degree of pigmentation of butter-fat, when adequate carotene is available in the diet, is determined by bread. Butter-fat derived from Jersey cows gave a yellow value twice that obtained with butter-fat derived from Shorthorn cows under similar nutritive conditions.

4. When the cow is at pasture the output of carotene and vitamin A in the butter-fat is very small in comparison with the amount of carotene available in the diet. On the other hand, during stall feeding upon a diet almost devoid of carotene the reserves of vitamin A available in the liver and elsewhere may be insufficient to meet the demands of prolonged lactation.

These deductions with respect to vitamin A and carotene are based on colorimetric determination.—Thomas Moore, *Biochem. J.*, 26:1, 1932.

**The Value of Some Vegetables in Nutritional Anemia**—In this experiment, dried spinach, lettuce, tomato, asparagus, broccoli, and turnip greens were studied for their effectiveness in curing nutritional anemia in the rat. Dried spinach when fed *ad libitum* and yielding an average daily intake of 0.43 mg. of iron and 0.0061 mg. of copper, effected hemoglobin regeneration in 3 to 4 weeks.

Lettuce plus tomato mixture, asparagus, lettuce, spinach, and broccoli—all fed at a level affording 0.20 mg. of iron but different amounts of copper—permitted hemoglobin regeneration in 4 to 5, 5 to 6, 6 to 7, 6 to 7, and 7 to 8 weeks, respectively, in the order of decreasing copper intake. Since variations in the iron and copper content of these vegetables are known to exist, it is to be borne in mind that a different order of anti-anemic potency would probably result from another set of the same vegetables. Turnip greens fed at a level furnishing 0.425 mg. of iron and 0.0179 mg. of copper brought about rapid regeneration in 3 to 4 weeks. When

fed at the same level of iron, a lettuce and tomato combination was found more effective than lettuce alone.

The above vegetables are, therefore, important sources of the minerals concerned in normal blood formation.

Iron alone or copper alone, when fed in the form of inorganic salt solutions, permitted only partial blood regeneration, whereas solutions containing both iron and copper effected rapid recovery of hemoglobin.—Harold Levine, F. B. Culp and C. B. Anderson, *J. Nutrition*, 5:295 (May), 1932.

**Relative Quantities of the Heat-Stable and Heat-Labile Fractions of Vitamin B in Raw and Evaporated Milk**—In this experiment, three different methods were used:

A. The separation of the two factors by fractionation of the milk solids and confirmation that the limiting factor is the heat-labile fraction.

B. Quantitative estimation of the relative amounts of the heat-labile fraction in raw and evaporated milks.

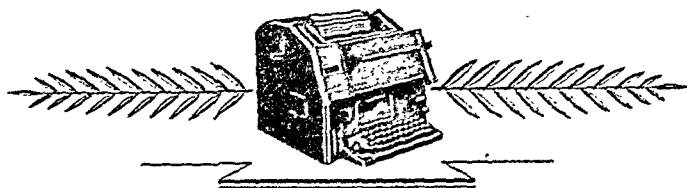
C. Quantitative estimation of the heat-stable fraction in raw and evaporated milks.

The results in the growth experiments show that milk contains all the water-soluble vitamins necessary for the growth of the rat, but that relatively large volumes must be taken to obtain optimum growth. Commercial evaporation has not seriously affected these substances.

These experiments have shown that commercial evaporation of cows' milk destroys about one-sixth to one-fifth of the antineuritic heat-labile fraction. All cows' milk seems to be quite low in this factor, however, 25 c.c. (3.49 gm. solids) being required per rat per day for optimum growth. Milks do not apparently vary widely in their antineuritic content as purchased on the market.

There is no identifiable destruction of the heat-stable, growth-promoting fraction during commercial

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later medical care, and in the reduction of and prevention of disease among workers in industry.

CHARLES A. KOFOID

**Man and Microbes**—By *Stanhope Bayne-Jones, M.D.* Baltimore: *Williams & Wilkins*, 1932. 128 pp. Price, \$1.00.

This volume is one of the Century Progress Series. The name of the author assures us that it is authoritative. It is well and interestingly written, and will serve a useful purpose for the class of people for whom it is intended. With these limitations in mind, it can be thoroughly recommended from every standpoint. MAZÛCK P. RAVENEL

**The Social and Ethical Significance of Nursing**—By *Annie W. Goodrich.* New York: *Macmillan*, 1932. 401 pp. Price, \$3.00.

Nurses everywhere will hasten to read this book which is a compilation of a series of addresses made by the author, who is one of the most brilliant nurses in America, over a period of more than a decade. These addresses deal with the nurse in her relation to ethics, education, the hospital, the community, the university, and the world.

Nurses will travel long distances to hear Miss Goodrich talk, and all their powers of concentration are called into play in listening, because her language is not that of the ordinary expository writer but that of the most finished literary scholar who draws from a wide range of literature for quotations to prove her points. She leaves her listeners and her readers with minds in the clouds and seeing some of the visions she sees of what the social and ethical significance of nursing has been, is now, and can be in the future. She is a highly inspirational speaker and writer, and might be called the nursing world's "least mortal mind."

This fine book which portrays the

struggles, beliefs and aspirations of the nursing profession in its search for the science of human betterment will be a classic in every nursing library. And it is to be hoped that great numbers of the laity will read it and absorb mentally and emotionally the sound philosophy and ideals of nursing which are so beautifully depicted. EVA F. MACDOUGALL

**Proceedings of the National Conference of Social Work**—*Chicago: University of Chicago Press*, 1931. 702 pp. Price, \$3.00.

In this volume are included the papers of 63 men and women widely known in social work who discuss the problems of social workers and their associates. Personality and health problems, the economic situation, the clinic and dispensary movement, costs of medical care, law enforcement, international aspects of immigration, and educational work with the Indians are among the subjects. In his presidential address, Dr. Richard Cabot particularly emphasizes the need of criterions and of tests of the success or failure of treatment in social case work.

IRA V. HISCOCK

**Child Health and the Community**—By *Courtenay Dinwiddie.* New York: *Commonwealth Fund*, 1931. 80 pp. Price, \$1.00.

Everyone who is concerned with child health is more or less familiar with the child health demonstrations conducted by the Commonwealth Fund. Many have read with the greatest interest the publications of the Fund which give in detail the story of the various demonstrations. Now we have a small volume from the pen of Mr. Dinwiddie which interprets the meaning and results of the four demonstrations—a thoughtful and readable exposition of theory and practice, so to speak. The volume is small but contains valuable material. We have first the background of the demon-

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WHEATON, F. E. Out from Confusion. Survey Graphic 66, 1275 (June 15, 1932).

**Milk-borne Poliomyelitis.**—An unusual opportunity to study an outbreak of poliomyelitis occurred in an institution using raw milk. The author of the paper reports finding his pleo-

morphic streptococcus in the throats and spinal fluids of cases, in well students and in the particular milk at fault. The paper will no doubt cause acute pain in those research workers who have been unable thus far to agree with Rosenow and his findings. However health officials will find in it another reason for pasteurization.

ROSENOW, E. C. An Institutional Outbreak of Poliomyelitis Apparently Due to a Streptococcus in Milk. J. Infect. Dis. 50, 5-6 (May-June), 1932.

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ANALGESIA. By W. Stanley Sykes. New York: Norton, 1932. 125 pp. Price, \$2.00.

MAY DEMENTIA OF SEX. By K. M. Walker. New York: Norton, 1932. 191 pp. Price, \$2.00.

THE MAINTENANCE OF ATHLETIC POWER. By C. H. McCloy. New York: Barnes, 1932. 185 pp. Price, \$3.00.

PAIN IN THE PERICARDIUM AND PERITONIUM. By Joseph A. Capps. New York: Macmillan, 1932. 99 pp. Price, \$3.00.

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PRINCIPLES OF HEALTH EDUCATION. By Clair Elsmere Turner. New York: Heath, 1932. 317 pp. Price, \$2.00.

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TEMPERATURE CONTROLLED CENTRIFUGALIZATION. International Equipment Co., Boston, Mass., 1932. 8 pp. Free.

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which became a checking account for the community. It is not the sort of an account on which checks are drawn, nor are its benefits to be reckoned in dollars and cents. Somebody in Pumpkin Creek decided that illness is an emergency which finds most people unprepared; so the women held bazaars, church suppers, and apron sales, and from the proceeds purchased the sick room supplies which are difficult for the average family in the outlying district to obtain. And now, when there is illness, the patient is made as comfortable as possible with clean linens on the bed, and equipment at hand for the necessary treatment. When the invalid recovers, the materials are washed and put away until the next emergency arises. So, although the checking account does not handle capital it does pay 100 per cent in community interest.

Sleepy Hollow has done its share, too. The people are as poverty stricken as the proverbial church mice, and when the rumor came that a dentist had arrived at a neighboring center, and that he was willing to do dental work for those who could not possibly afford to pay for it, there was a community-wide consultation about ways and means. Every parent wanted his child's teeth cared for, but a 20-mile walk was out of the question, and the whole district boasted only one car, if it could be called such. The vehicle was a model T Ford which had long since passed its 15th birthday. One woman, a courageous soul, volunteered to engineer the thing if the wherewithal for gas could be obtained. And it was—pennies—a nickel occasionally—an even more infrequent dime (dollars were unheard of in Sleepy Hollow), and finally the contributions were collected. The "limousine" was packed to the top with assorted children of every age and size, and bounced merrily off upon its way. So were the youngsters introduced to their first dentist, and when they rattled back to their homes at night with missing teeth, and the busy hum of the drill still ringing in their ears, each was the proud possessor of a tooth brush, and the day, to Sleepy Hollow, was a red-letter one, not to be quickly forgotten.

Still another community instituted a different type of service. Health work in this particularly isolated district in the northernmost point of Michigan is as yet a pioneer. The nurse is forced to confine her attentions pretty largely to the school children, since the roads are impassible for a large part of the year, and the families are widely scattered. So it was decided that since she could not possibly reach the preschool children, they would come to her. Accordingly, the school turned itself into a combined nursery and clinic, and gave a "party" for 25 little folk, from 1 year to 5, who came with their



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Made from wheat flour, wheat bran, malted barley and bicarbonate of potassium — consisting essentially of maltose, dextrins, proteins and mineral salts.

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and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume XXII

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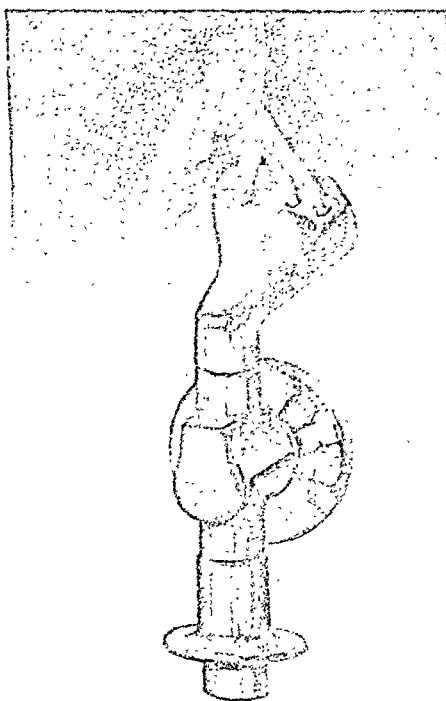
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Practice—  
Yesterday  
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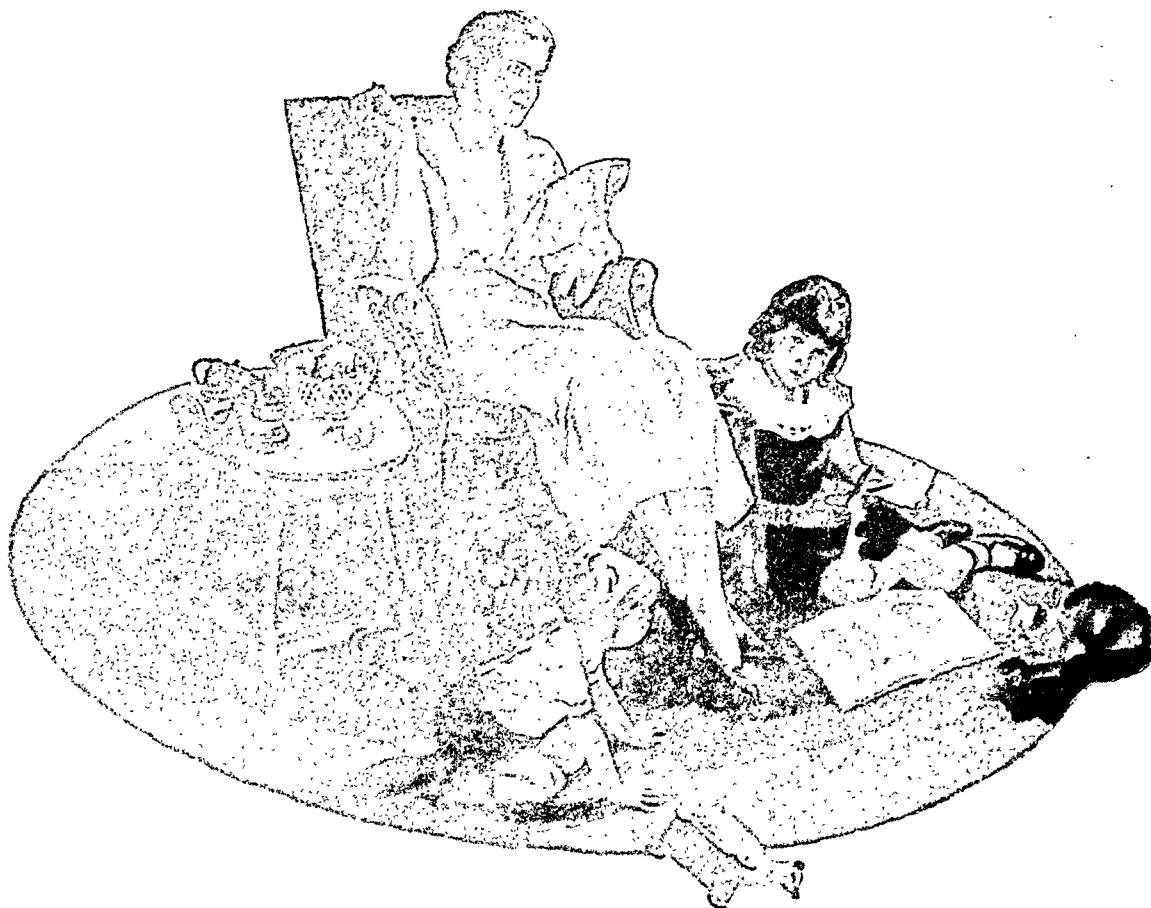
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Information  
for  
Physicians



Mellin's Food  
mineral salts.

## Milk Modifier

### Approximate Values

1 Level Tablespoonful	.	.	.	25 Calories
1 Ounce (by measure)	.	.	.	48 Calories
1 Ounce (by weight)	.	.	.	105 Calories

### 5 Level Tablespoonfuls of Mellin's Food

added to any dilution of milk that in the physician's judgment is suitable to the weight and age of the individual baby furnishes 125 calories, which is equivalent to the addition of 1 ounce (by weight) of carbohydrates—the minimum amount of "sugar" usually employed by physicians in preparing an infant's diet for the twenty-four hour period.

### 10 Level Tablespoonfuls of Mellin's Food

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June, 1932

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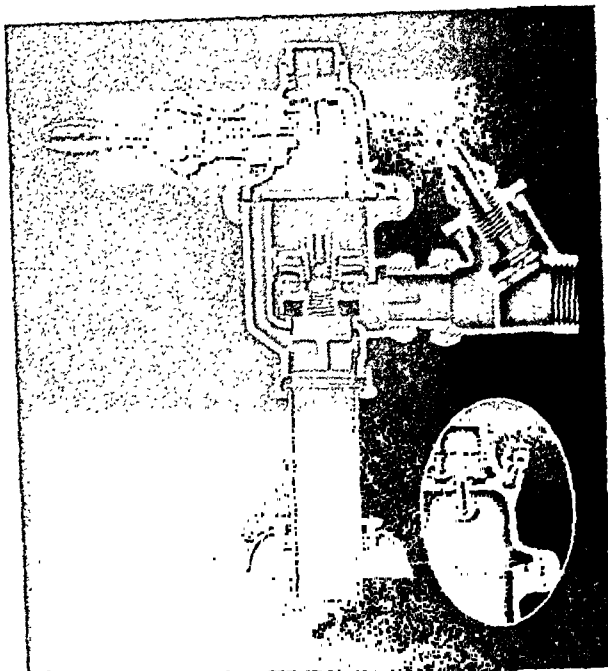
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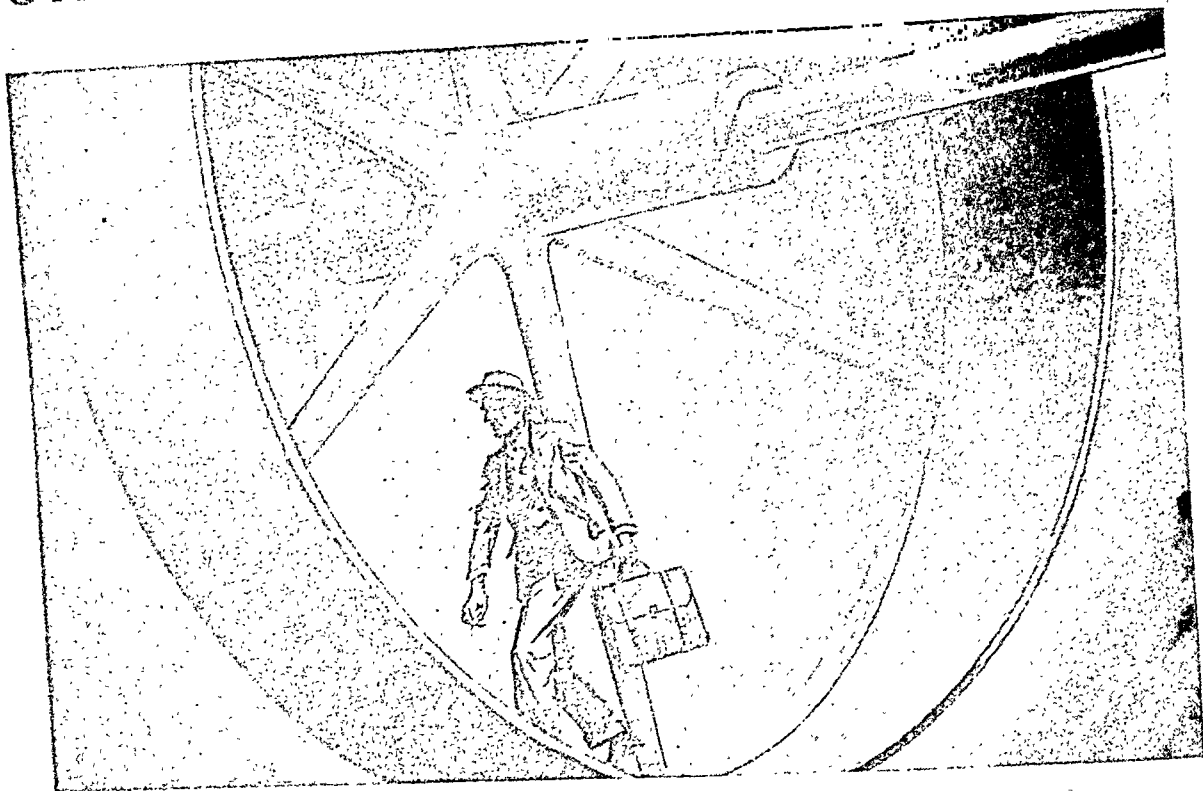
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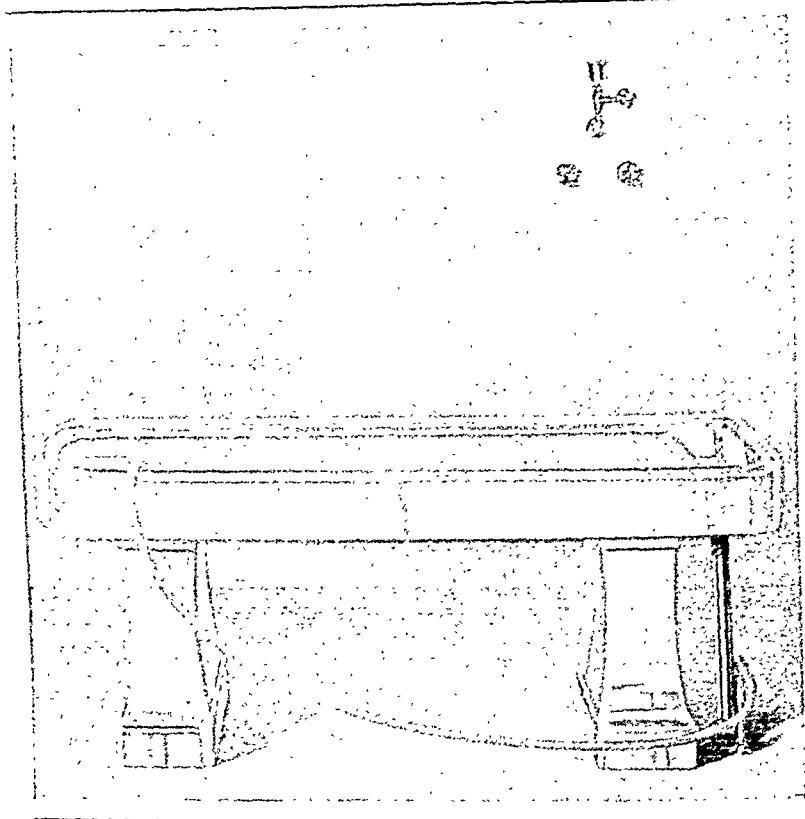
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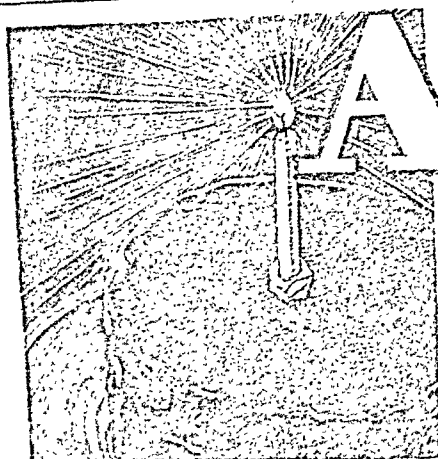
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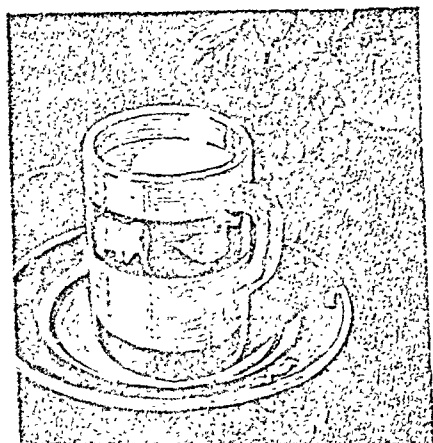
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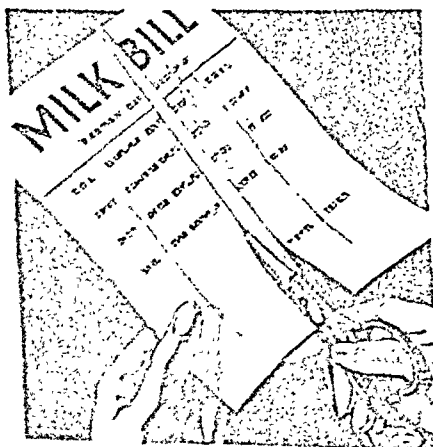
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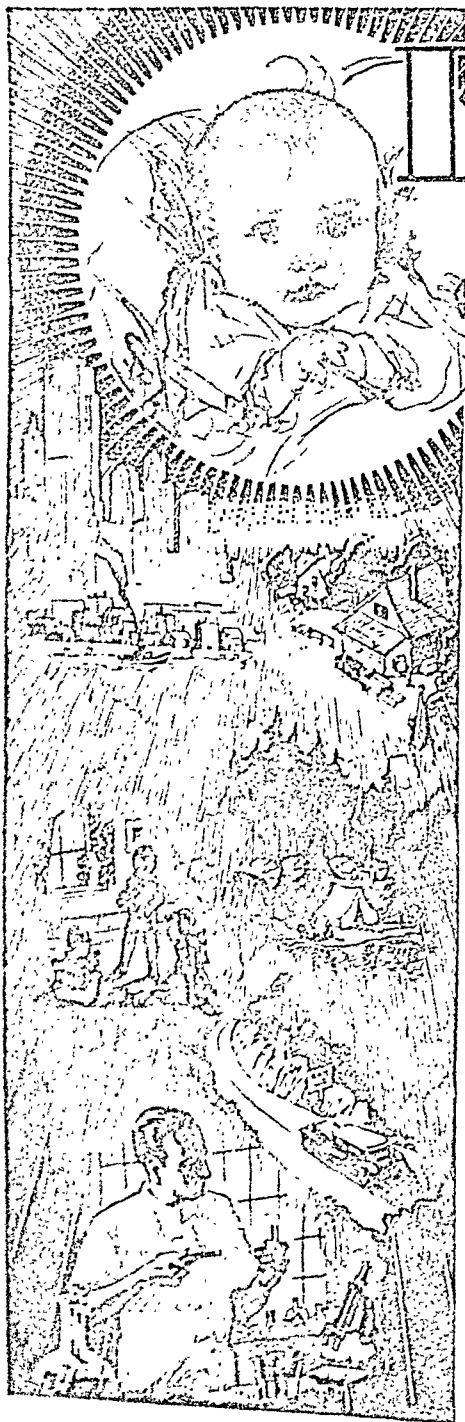


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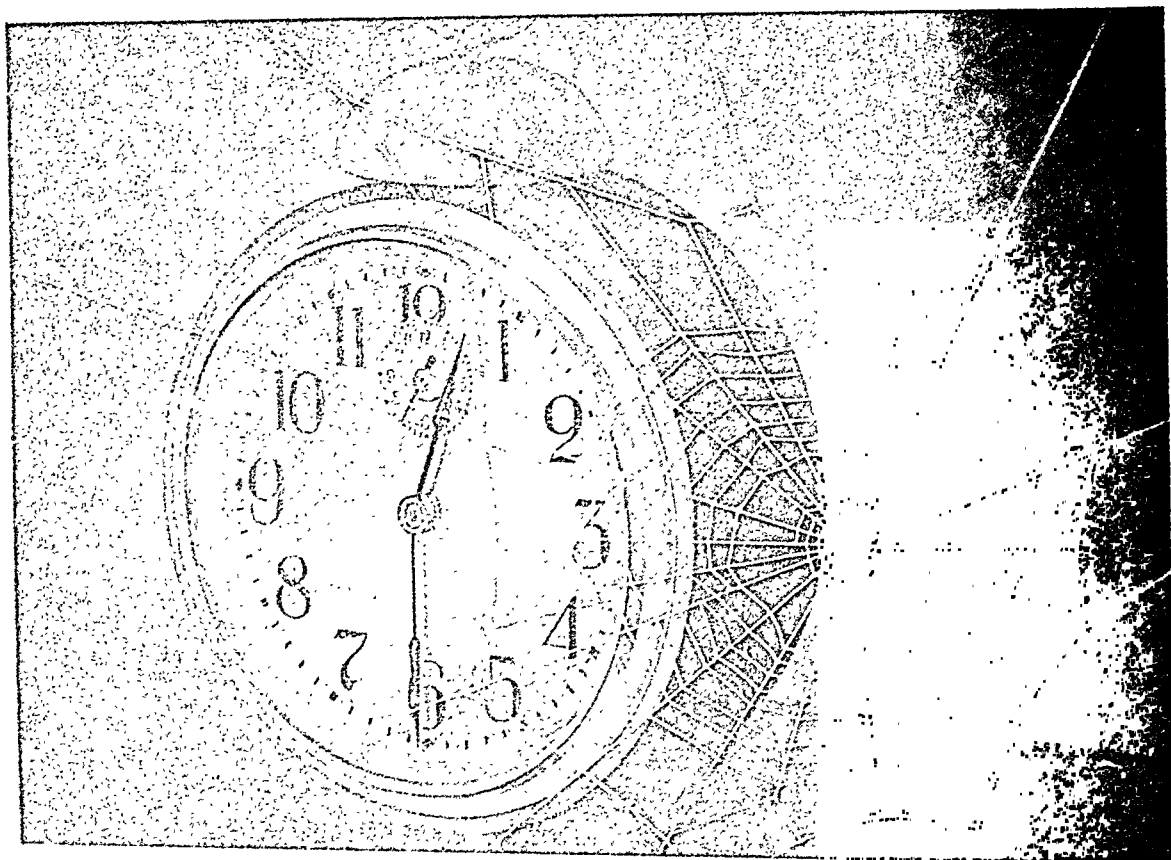
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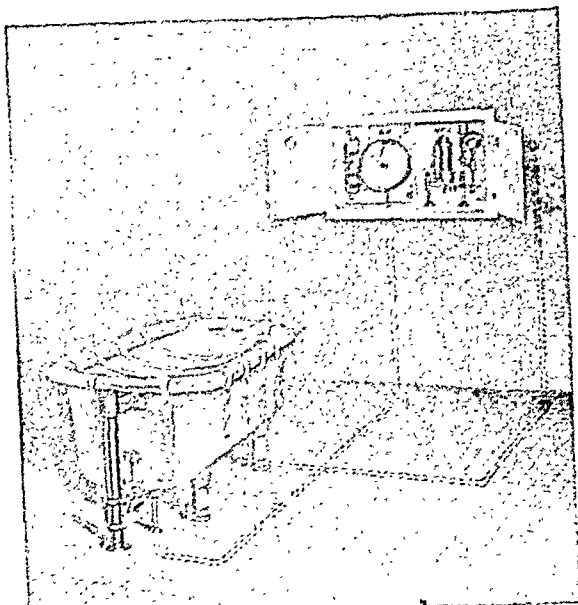
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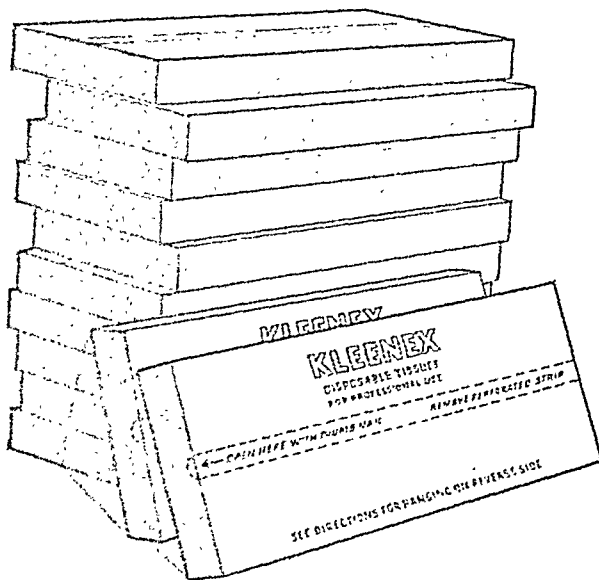
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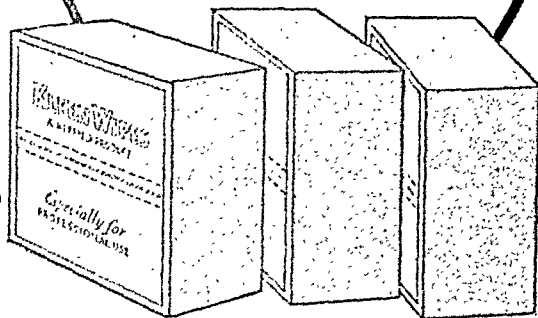
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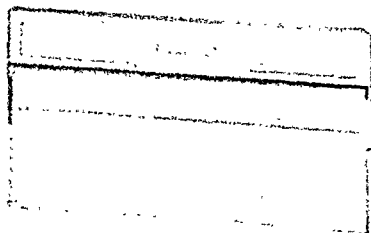


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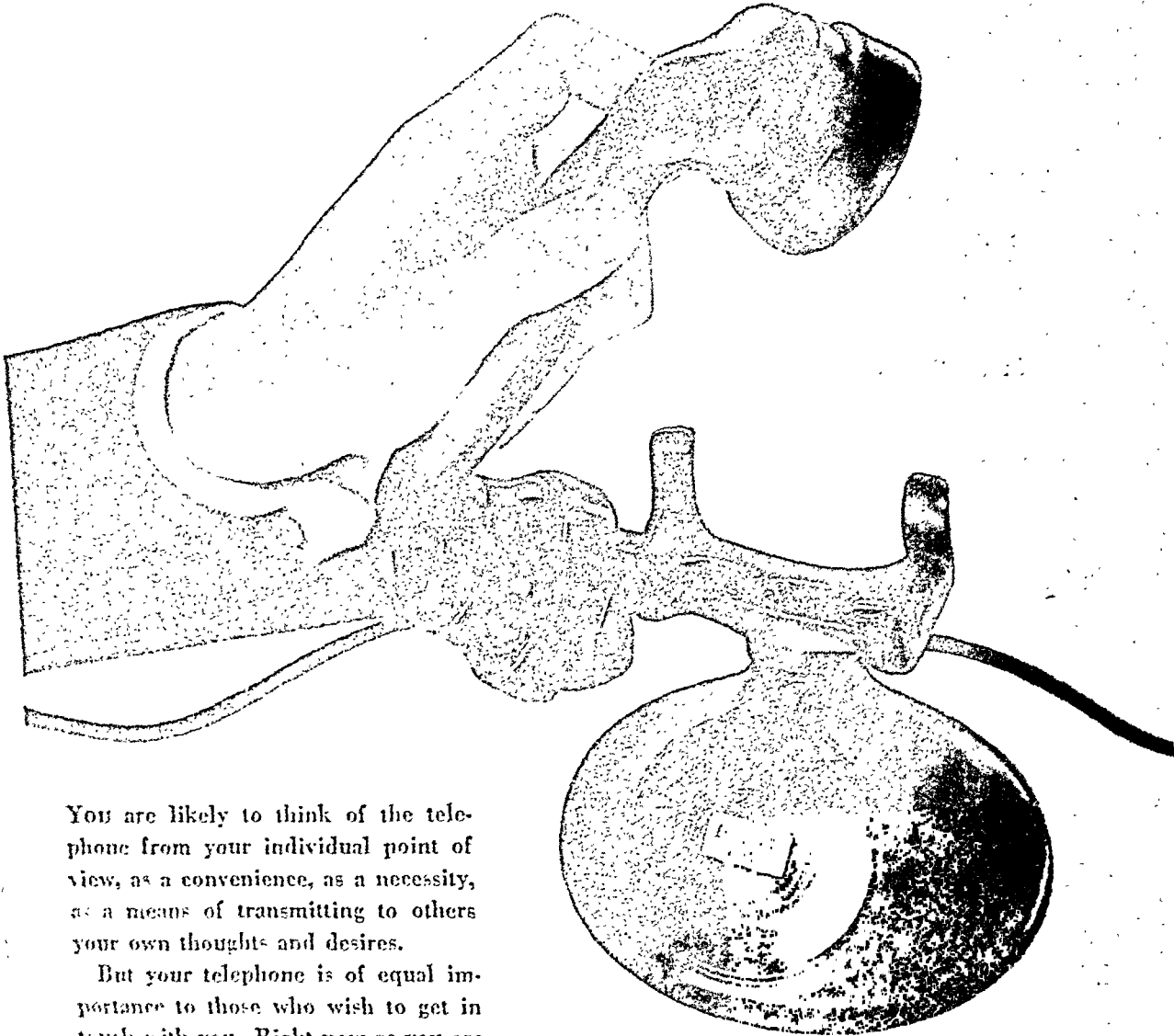
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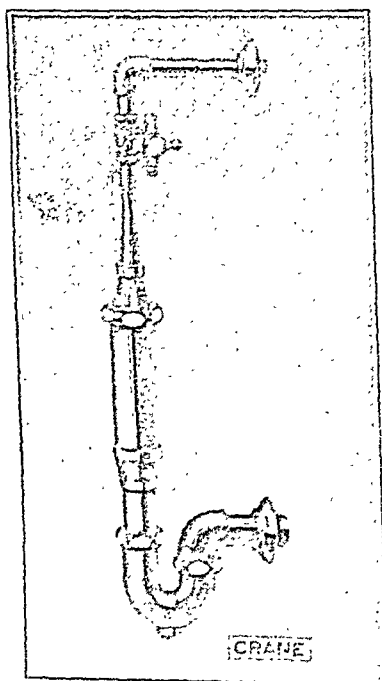
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Number 1

### Cost of Sanitary Survey of Streams<sup>\*</sup>

W. L. STEVENSON, F. A. P. H. A.

*Chief Engineer, Pennsylvania Department of Health, Harrisburg, Pa.*

THE awakened public conscience as to the conservation of water resources and abatement of stream pollution is creating demands upon some state health departments to increase their activities along these lines, upon others to inaugurate such work.

Usually bureaus of engineering of health departments are not overburdened with larger appropriations than they can wisely expend. In fact, generally, great care must be used in allotting the available funds among their many present activities so as to secure the maximum possible returns in protection and promotion of the public health.

Therefore, the cost of making sanitary surveys of streams is an important matter; hence this brief contribution.

The Bureau of Engineering of the Pennsylvania Department of Health is the agent of the Sanitary Water Board in making surveys of streams:

1. To find those which are clean
2. To determine the sanitary condition of the larger streams and rivers
3. To determine and evaluate the source of pollution
4. To lay out practicable programs for sanitary improvement of whole river systems
5. To study, in more or less detail, industrial wastes which cause harmful stream pollution

For the first item (finding clean streams), technically trained men are not needed. The bureau has a corps of "Stream Surveyors" operating under a Chief of Party. It consists of 7 young men, keen to observe, trained to locate themselves in the field from maps, tactful in dealing with citizens whom they interview, and above all else, faithful

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<sup>\*</sup> Read before the Public Health Engineering Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 17, 1931.

in doing their work completely. Three of them are only summer employees. Inexpensive automobiles are provided to the number of one-half the corps, save that the Chief Surveyor has one for his own use.

They operate in the sparsely settled parts of the state. Temporary headquarters are established at some small country hotel and working from this as a center actual traverse on foot is made of all the streams in that neighborhood to search for "artificial" sources of pollution such as sewers from dwellings, overhanging privies, discharge from milk receiving stations and the like.

These data are recorded on suitable report forms and noted on field blue print maps to indicate exact location, name and address of responsible party, kind of discharge and idea of abatability.

Most of these minor pollutions are violations of rules and regulations of the Department of Health as to public health nuisances. Where the stream surveyors find such pollutions, they verbally inform the responsible party that abatement should be made, and leave a signed statement of "Advice" as to how to make abatement. A copy of this "Advice" is sent to the main office, attached to the form report on the case. At least two reinspections are made, if necessary to determine whether abatement has been effected. In this informal way innumerable abatements are attained.

Where the advice is unheeded, report is so made to the Central Office and a formal "Abatement Notice" is served by one of the department's inspectors who are enforcement officers, and if this is not complied with legal action is taken pursuant to provisions of Pennsylvania law.

The maps with crayon notations made by the stream surveyors showing those streams free from artificial pollution are first sent to the proper district engineer for review and comment, then come to the Central Office, where they are carefully examined, the miles of clean streams measured, and then submitted to the Sanitary Water Board which thereupon formally designates the clean streams as Class "A." Every possible effort is made thereafter to keep them in that wholesome state. For instance, should a summer hotel be erected on the catchment area of a Class "A" stream, nothing less than complete sewage treatment would be considered or approved by the Sanitary Water Board.

As this work progresses the aggregate mileage of Class "A" streams in Pennsylvania is annually increasing through abatement of these minor pollutions.

The salaries of the Stream Survey Corps total \$7,400 a year, for both full-time and summer-time employees. Their living and travel

expenses in the field are paid, including automobile costs, and amount to about \$8,000 a year. The total operating cost of the corps is, therefore, about \$15,400 a year. Allowing about 20 per cent deduction from this total cost for time spent by stream surveyors on special detached service the net cost of the Stream Survey Corps while on regular duty is about \$11,500 a year, and about 3,500 miles of stream can be so surveyed each year. Therefore, it costs about \$3.30 per mile of stream, including reinspection for abatements as well as the not inconsequential education of the public which is an important activity of the Stream Survey Corps.

For sanitary surveys of the larger streams and rivers mobile laboratories are used by chemical engineers. Each laboratory is equipped to do dissolved oxygen, 5 days oxygen demand at 20° C., alkalinity or acidity and pH determinations. A new mobile laboratory is also being equipped for bacteriological work including total number of bacteria at 37° C. and presumptive *B. coli* tests.

In the earlier scientific stream studies the large heavy laboratories were driven as near as possible to the sampling point. Experience showed this to be generally undesirable because of difficulties in driving the heavy laboratory over poor dirt roads and lanes leading from the main paved highway down to the river banks. The present practice is to establish temporary headquarters for the mobile laboratory in some town centrally located to the stretch of river under examination and for the engineer to collect samples of the river water using a small inexpensive automobile as a "feeder car."

Automatic gauging stations are established on the river so that rate of flow is known at sampling times. This allows scientific comparison to be made of analyses taken at known different river stages. Sampling is done during the low flows of warm weather, except in cases of streams receiving acid coal mine drainage in which the degree of alkalinity or acidity is the dominant feature. At reasonable stream stages such work can continue nearly all year.

On wide rivers cross-section studies are made because of the influence of tributaries, and in places where heavier pollution is on one side of the stream than the other.

Sampling stations are established above known major discharges and at places below where it is deemed that the discharge has become reasonably diffused in the river water. Also sampling stations are established at the mouth of major tributaries in order to determine whether they are harmful or refreshing influences to the main river. Later similar work is extended up the tributaries which are found to be harming the main stream.

At high river stage and during cool weather the chemical engineers with their mobile laboratories study industrial wastes discharged into the stream. A basic policy in such study is always to endeavor to reach the highest possible official at the factory, explain that the purpose of the survey is to determine scientifically the sanitary condition of the stream, evaluate the sources of pollution, and find reasonable and practicable ways and means for improving the sanitary quality of the river.

In the earlier studies of individual industrial wastes the responsible executives were informed that the survey was not being made to gather information for prosecution and that if access to the factory were granted and the desired information furnished, the data so collected would be for the exclusive use of the state authorities. Such executives of industrial concerns were given a copy of the analytical report bearing a signed statement that the report was for the "exclusive use of the Sanitary Water Board."

This policy made possible the study of industrial wastes unmixed and at their points of origin in factories, where otherwise this would have been difficult, if not impossible to accomplish. The reputation of the Sanitary Water Board and its agents for "square dealing" has become so well known in Pennsylvania that it is now rarely necessary to go through the more or less cumbersome formality of officially guaranteeing confidential treatment of information secured within industrial establishments and, furthermore, the executives of practically all industrial establishments now recognize that, in view of present-day sentiment of the public and governmental agencies, it is unwise to attempt to conceal information concerning their waste water discharges.

No effort is made to measure the rate of flow or sample and analyze municipal sewage. Its load upon the stream is determined by estimating the human population connected to the sewer system and adding thereto the industrial wastes admitted to the sewers converted into equivalent human sewage by computation of B. O. D. figures.

Upon the completion of such a survey diagrams are prepared showing the average dissolved oxygen and oxygen demand in p.p.m. at each station; also by symbol maximum and minimum observations. The difference shows oxygen balance. Per cent saturation dissolved oxygen, alkalinity or acidity, bacteria, etc., are also platted.

On other diagrams the pollution loads producing these conditions are shown by ordinates to a scale of human sewage to which B. O. D. of organic industrial wastes are converted by the factor 0.22 lb. oxygen demand per diem per capita.

These diagrams are used by the executive engineer of the bureau in recommending degree of treatment of municipal sewage indicated as needed to maintain a sanitary condition of the river fit and suitable for its present and probable future public uses.

They are also used in negotiating with the parties responsible for harmful industrial waste pollution, always first visiting the concern which the diagram shows to be the cause of the heaviest load on the stream or the most harmful, as for instance in proximity to a water works intake.

The salaries and expenses of the chemical engineers and their assistants vary, and hence only aggregate figures can be given.

The records show that salaries, expense accounts, maintenance of mobile laboratories and feeder cars, and other incidental expenses in this field work, exclusive of the salary and expenses of the executive and district engineers engaged in negotiations, have cost about \$30,000 for doing work such as described above in an average working year.

Some of the scientific studies are of heavily polluted streams in densely populated and highly industrialized districts, whereas others concern problems involving only a few sources of pollution affecting an otherwise clean stream, and it would be obviously unfair to attempt to compare the costs of surveying equal lengths of such widely different streams. Again, the activities of one year may be centered almost entirely on streams where the problem is very complicated and progress slow whereas in another year the surveys conducted may be largely of streams where results can be secured with less effort and in shorter time. Then too, conditions of stream flow in a given year may not be favorable to scientific surveys and much time may be lost due to interruption of traverse studies by repeated rises in stream stage. However, it is roughly estimated that in an average year of actual field work in scientific stream surveys, including studies of industrial wastes and preliminary negotiations relative thereto, about 300 miles of main stream can be covered. This indicates, as qualified above, an approximate cost of \$100 per mile of stream.

It must be borne in mind that a river once surveyed is not by any means a permanently completed job, and that the real success in accomplishing improvement in the sanitary condition of streams is only obtainable by eternal vigilance and repeated surveys. Sewage treatment works become overloaded, industrial waste treatment works may be neglected, new industries may be established, and new methods of waste treatment may be developed which are applicable to previously unsolved problems. As a matter of fact, it has been found necessary, once a study of a large river in a heavily industrialized territory has

been undertaken, to leave one or more men permanently assigned to each project for constant follow-up.

The population of Pennsylvania is about 10 millions; there are nearly 1,000 municipalities more or less sewered and over 2,500 industrial places discharging waste waters. The aggregate length of streams in the state is about 100,000 miles.

For the biennium beginning June 1, 1931, there is available in Pennsylvania for work incident to public sewerage, industrial wastes and sanitary conservation of water resources about \$330,000. Of this, \$50,000 is a special appropriation to the Sanitary Water Board for a salinity survey of the tidal estuary of the Delaware River, \$225,000 to the board for its general work, and the remainder is from the allotment to the Bureau of Engineering from the appropriation to the Department of Health.

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## Immunization

THE address of Professor Major Greenwood, in opening the section of Pathology at the annual meeting of the British Medical Association, carried forward the work on experimental epidemiology, with which the names of Topley and Greenwood are associated. It brings out two points: first, active immunization is of more importance than primary selection in resisting infection; and, second, the immunity conferred by virus diseases is different (at all events in intensity) from that conferred by bacterial diseases. Both of these propositions have substantial clinical backing.

The safety of any individual in an infective environment depends upon many factors, three of which are personal: initial "strength," immunity produced by contact, and immunity produced artificially. The first is the weakest, the second the strongest. In no case is resistance absolute. The nearest approach to absolute immunity would appear to be a preliminary clinical reaction followed by continuous, somewhat severe, exposure. We should imagine a fever nurse who had had diphtheria to have the maximum possible resistance to a second attack of that disease, yet it is possible even for her to die from it.

Light is also thrown on the value of pre-immunization. Here clinical and experimental work are in complete agreement; immunization tides over a difficult or particularly dangerous period; its effect is not permanent. Diphtheria immunization carries children over the dangerous age of 1 to 7; more than that it probably cannot do, and, generally, no more than that is requisite.—The Difference Between an Epidemic of One Disease and That of Another, *Med. Off.*, Oct. 24, 1931, p. 177.

# Diphtheria Toxin-Antitoxin and Toxoid\*

## A COMPARISON

WILLIAM H. PARK, M. D., F. A. P. H. A., AND  
MAY C. SCHRODER, M. D.

*Bureau of Laboratories, Department of Health, New York, N. Y.*

THESE two preparations, toxin-antitoxin and toxoid, are now being widely used for immunization of infants and young children against diphtheria. Toxin-antitoxin has been longest in use. Behring was the first to employ it experimentally as an immunizing injection in man. His preparation was the undiluted toxic broth with its toxin nearly neutralized by antitoxin. He never gave a clear explanation of how he prepared and standardized it. The breaking out of the war delayed the practical utilization of toxin-antitoxin in Europe.

Park and Zingher were the first to realize that by using the Schick test to determine the susceptibility of the children, and a retest to note the changes in reaction, we could study the immunizing effect of toxin-antitoxin injections in human beings. We demonstrated that immunity developed in about 85 per cent of those receiving 3 injections of our 3 L + preparation at intervals of 1 week, and by 1917 we realized that it lasted in the great majority of cases for at least several years. We also tried giving it at intervals of 2 weeks, but the results were only moderately better. Schroder followed the Schick reaction in the immunized children for a longer time and in 1925 found that the period of immunity extended to 10 years for at least 80 per cent of them. These were New York City children. As a rule the same children were not retested in order to avoid the possibility of the Schick test adding its immunizing effect. The long duration of immunization might have been due in some to the added immunizing effect of repeated infection from carriers.

In 1918 we began the serious attempt to immunize the whole child population of New York City. This earlier work was concerned mostly with children of school age, as most parents were not yet willing to have the injections given to the babies and very young children. We noted that in a small percentage of the children the injection gave

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\* Read at a Special Session on Toxoid Immunization of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 15, 1931.

quite a severe local reaction. To lessen this, we tried diluting the toxin before adding the antitoxin, and found that when as little as 0.1 L + dose of toxin was given in an injection, the immunizing effect was as good as when a 3 to 6 L + dose was used. Smaller amounts of toxin were less immunizing. The most important point is that the toxin-antitoxin to have its maximum effect has to have such a toxicity that a human dose kills a 250 gm. guinea pig in about 4 weeks. With decreasing toxicity the immunizing effect is gradually diminished.

This new preparation gave much less local reaction in children of school age, since this reaction was due, not so much to the specific toxin as to the other elements, especially the dissolved bacillus substance. It was found that even when the toxin-antitoxin was stored in good glass and kept cool the product became gradually somewhat less toxic. The reverse never happened with the 0.1 L + preparation except when it was frozen and then the increase in toxicity was not sufficient to be in the least dangerous. This characteristic of becoming less toxic is a real drawback, because many commercial preparations suffer this during transportation and the period of storage, and when this happens, 3 injections may cause only 50 to 75 per cent of the children to change from a Schick positive to a Schick negative state, instead of the expected average of about 80 per cent.

When toxin-antitoxin is accurately standardized, a full dose, injected just under the skin of the anterior surface of the arm, acts both as an immunizing injection and as a substitute for the Schick test. The result in the older children is not quite so accurate an index of immunity as that from the Schick test, but the error is on the safe side. This slight difference is due to the fact that a dose of suitable toxin-antitoxin is a little more toxic than the Schick test dose, and also to occasional nonspecific protein reactions. We have found that this use of toxin-antitoxin is a very valuable help among the school children of New York City, since without using the Schick test we are enabled to save fully 50 per cent of them from the second and third injections, as they are shown by their negative reactions to be immune. The readings are not made until the 5th or 6th day, to allow, in most cases, for the disappearance of the pseudo-reactions, which are more pronounced than with the Schick test. The 6th day is also a suitable time for the second injection in those who require it.

The possible objection, when horse antitoxin was used, that the approximately 0.001 c.c. of horse antitoxin in the immunizing dose sensitizes the injected children to later injections of therapeutic doses of an antiserum from the horse, has been removed by substituting antitoxin from the goat. We are convinced that the fear of sensitization



was greatly exaggerated, but it was wise to substitute goat antitoxin to remove any objection. This preparation of toxin-antitoxin is used generally in the United States and has given satisfaction. In New York City alone, during the past 15 years, more than 500,000 school children have been given toxin-antitoxin, and during the past 2½ years, owing to an intensive drive to stamp out diphtheria, inaugurated by the Commissioner of Health, Dr. Wynne, more than 250,000 infants and preschool children have received it. Deaths from diphtheria in New York City during 1930 were only 198 against 416 for 1929, and 800 for 1920. The figures for the first 8 months of 1931 are even better than those of 1930. During this time, the population has considerably increased. All this immunization work was performed without any accident.

Only 4 serious accidents have occurred from toxin-antitoxin injections in other cities of the world, and these would have happened just as readily if toxoid had been used. The first took place in the United States and resulted from the sending by mistake of a proved overtotoxic preparation. The second and third happened in Austria and Russia and were caused by the accidental distribution and injection of a diluted diphtheria toxin for toxin-antitoxin; while the fourth occurred in Australia, due to the use of a toxin-antitoxin preparation which had no antiseptic in it and which was stored in large bottles. The contents of one of the bottles after having been opened several times became contaminated by virulent staphylococci.

Within recent years, efforts have been made by bacteriologists to obtain a better preparation than toxin-antitoxin. Park, Zingher and Schroder stated in 1924 that a toxin which had been changed to toxoid by long standing gave remarkably good immunizing results, though the marked pseudo-reactions occasionally caused by it made it less desirable, in their opinion, for school children who made the majority of those being immunized, than the new preparation of toxin-antitoxin. Glenny and his associates, by the use of formalin, reduced toxin to a slightly toxic toxoid, and found this, when its remaining toxicity was partially neutralized by antitoxin, an excellent immunizing agent. Like toxin-antitoxin, the toxoid was diluted and gave less reaction than undiluted toxoid.

The best immunizing material now in use is, however, the *non-toxic* diphtheria toxoid which Ramon developed. He adopted the suggestions of Glenny as to the use of formalin, and of Loewenstein of Vienna as to the value of non-toxic toxoid in tetanus. He was able also to prepare a stronger toxin, and therefore toxoid, than had previously been prepared. Starting with a highly potent toxin, he reduces

its toxicity by the addition of formalin and its storage at 37° C. until it is practically non-toxic. The greater the number of L + doses in the original toxin, the better the immunizing effect of the toxoid. With toxoid sent us by Ramon, or made by Povitzky in our laboratory, we have obtained no greater pseudo-reaction from an intramuscular injection of 0.5 c.c. in little children than from the equivalent dose of 1 c.c. of toxin-antitoxin, and but little more from 1 c.c. injections, but in school children the toxoid preparations produce on the average somewhat more marked reactions than do 1 c.c. injections of toxin-antitoxin.

The immunizing effects of our best toxoid have been better than from the best properly standardized toxin-antitoxin. We have therefore recently adopted the toxoid (Ramon) for the children of pre-school age in New York City, but continue to use toxin-antitoxin for the school children and for such adults, as for instance, nurses, who require it. We may soon employ the toxoid entirely, especially, if we are able to reduce the substances in it which cause pseudo-reactions.

We have also recently tried out the inunction of toxoid mixed with lanolin (Loewenstein) and have obtained a change from a positive to a negative Schick reaction in about 70 per cent of the children on whom it was used. The 4 or 5 rubbings were made at weekly intervals. This method has certain advantages in cases where the mothers object to the use of the needle and in institutions where a nurse can apply it to the children as they enter. The ointment should be thoroughly rubbed into the skin. For general use it is more time consuming and less effective than the subcutaneous or intramuscular injection of toxin-antitoxin or toxoid.

#### INCREASE OF THE POTENCY OF DIPHTHERIA TOXOID THROUGH THE ADDITION OF ALUM

Two years ago, Glenny, working under the direction of O'Brien, found that the addition of sufficient alum to the toxoid to make a 0.2 to 0.5 per cent solution increased appreciably its power to develop antitoxin when injected in horses. We tried his methods with good results. It occurred to us that toxoid containing alum might be advantageously used in infants and children. Schroder injected about 100 children last spring with very favorable results. A report of this was made by one of us at the international meeting of the Microbiological Society at Paris last June. O'Brien told me that they had also tried it in a few children with favorable results. During the past 10 months, Schroder and Blum have injected additional children, and we have made a comparison of the results following the use of toxin-

TABLE I

A COMPARISON OF THE IMMUNIZING EFFECT OF DIPHTHERIA TOXOID, TOXOID PLUS ALUM AND TOXIN-ANTITOXIN IN GUINEA PIGS

Fraction of 1 c.c. Given and Number of Doses	Average Number of Minimal Fatal Doses Neutralized in Guinea Pigs After 1, 2 and 3 Doses of			
	Toxin-Antitoxin	Toxin-Antitoxin Alum	Toxoid	Toxoid and Alum
1/16	1.5	1.5	3	3
1/16, 1/16	3.0	5.0	6	15
1/16, 1/16, 1/16	5.0	15.0	40	60
1/8	1.5	1.5	5	10
1/8, 1/8	3.0	4.0	25	80
1/8, 1/8, 1/8	15.0	25.0	30 +	90 +
1/4	2.0	3.0	10	30
1/2	2.0	3.0	50	80
Total doses neutralized by 8 guinea pigs	33.0	58.0	169 +	368 +

Injections given at intervals of 1 week. Retests done at the end of 2 months. Note the much greater number of fatal doses neutralized by the guinea pigs receiving toxoid, especially by those receiving toxoid plus alum.

TABLE II

THE INCREASED EFFECT OF GIVING A DEFINITE QUANTITY OF TOXOID IN DIVIDED DOSES RATHER THAN IN A SINGLE ONE

	Number of m.l.d. overcome by guinea pig
A single dose of 1/2 c.c. of toxoid plus alum	80
A single dose of 1/4 c.c. of toxoid plus alum	30
Two doses of 1/8 c.c. with interval of 1 week	80
A single dose of 1/2 c.c. of toxoid	50
A single dose of 1/4 c.c. of toxoid	10
Two doses of 1/8 c.c. with interval of 1 week	20
Three doses of 1/16 c.c. with intervals of 1 week	40

antitoxin, toxoid, and toxoid with alum, in the children living in institutions. By dividing them into similar groups and giving children of similar age the injections, we felt we might obtain valuable information. Finally Welton, who has charge of our Otisville branch laboratory, injected some 500 guinea pigs with one or other of the 3 preparations. The results of these tests in children and in guinea pigs are shown in Tables I to VI.

#### DOSAGE OF TOXIN-ANTITOXIN

The almost universal custom is to give 3 injections of 1 c.c. each. A few have advised 4 or even 5 injections. More than 3 are hardly necessary, if properly prepared and preserved preparations are used. In 149 young children in which 1 c.c. of a well tested preparation was

TABLE III

THE COMPARATIVE VALUE OF INTERVALS OF 1 AND 2 WEEKS BETWEEN INJECTIONS. NUMBER OF INJECTIONS 2 AND 3. MATERIAL TOXOID WITH 0.2 PER CENT ALUM

No. of Pig	1st Dose	2nd Dose	2nd Dose	M.I.d. 8/12/31	Day of Death
	2 Injections				
	7/3/31 c.c.	7/10/31 c.c.	7/18/31 c.c.		
1	1/8	1/8		20	*
2	1/8	1/8		20	*
3	1/8	1/8		30	3rd
4	1/8	1/8		30	**
5	1/8	1/8		30	**
6	1/8	1/8		30	**
7	1/8	1/8		60	*
8	1/8	1/8		60	*
9	1/8	1/8		60	3rd
10	1/8	1/8		100	3rd
11	1/8	1/8		100	4th
12	1/8	1/8		100	2nd
13	1/8	1/8		150	4th
14	1/8		1/8	20	5th
15	1/8		1/8	20	2nd
16	1/8		1/8	30	*
17	1/8		1/8	30	*
18	1/8		1/8	30	2nd
19	1/8		1/8	30	*
20	1/8		1/8	60	**
21	1/8		1/8	60	*
22	1/8		1/8	60	2nd
23	1/8		1/8	100	3rd
24	1/8		1/8	100	*
25	1/8		1/8	100	3rd
26	1/8		1/8	150	*

\* Destroyed 8/27/31 because of necrosis at site of toxin injection.

\*\* Still living and healthy, discharged.

Pigs at beginning of immunization weighed from 260 to 300 gm.

Pigs at time of toxin injections weighed from 700 to 900 gm.

The difference shown in these two sets of guinea pigs is very slight.

recently injected by us we obtained 90 per cent of success. With over-neutralized preparations others have obtained at times as little as 50 per cent of immunization.

#### DOSAGE OF TOXOID

The potency of toxoid depends on the number of antigenic units contained in a specified amount. These can be approximately determined by the L + doses of the original toxin or by the flocculation units of the toxoid when ready for use. A good preparation and one which should be produced by all biological laboratories contains at least 8 antigenic or flocculation units per c.c. A department of health

TABLE IV

THE COMPARATIVE VALUE OF INTERVALS OF 1 AND 2 WEEKS BETWEEN INJECTIONS. NUMBER OF INJECTIONS 2 AND 3. MATERIAL TOXOID WITH 0.2 PER CENT ALUM

No. of Pig	3 Injections				M.l.d. 8/12/31	Day of Death
	7/3/31 c.c.	7/10/31 c.c.	7/18/31 c.c.	7/31/31 c.c.		
27	1/8	1/8	1/8		30	8th
28	1/8	1/8	1/8		60	
29	1/8	1/8	1/8		60	5th
30	1/8	1/8	1/8		60	5th
31	1/8	1/8	1/8		60	3rd
32	1/8	1/8	1/8		100	*
33	1/8	1/8	1/8		100	*
34	1/8	1/8	1/8		100	**
35	1/8	1/8	1/8		100	**
36	1/8	1/8	1/8		150	**
37	1/8		1/8	1/8	30	*
38	1/8		1/8	1/8	60	**
39	1/8		1/8	1/8	60	*
40	1/8		1/8	1/8	60	**
41	1/8		1/8	1/8	60	**
42	1/8		1/8	1/8	100	**
43	1/8		1/8	1/8	100	**
44	1/8		1/8	1/8	100	**
45	1/8		1/8	1/8	100	**
46	1/8		1/8	1/8	100	**
47	1/8		1/8	1/8	150	**
48	1/8		1/8	1/8	150	**
49	1/8		1/8	1/8	150	**

\* Destroyed 8/27/31 because of necrosis at site of toxin injection.

\*\* Still living and healthy, discharged.

Pigs at beginning of immunization weighed from 260 to 300 gm.

Pigs at time of toxin injections weighed from 700 to 900 gm.

The guinea pigs having a 2-weeks interval certainly show somewhat more resistance to the toxin.

TABLE V

A COMPARISON OF THE IMMUNIZING POWER OF TOXOID WITH AND WITHOUT THE ADDITION OF ALUM IN INFANTS AND YOUNG CHILDREN LIVING IN HOME FOR HEBREW INFANTS  
THREE INJECTIONS GIVEN AT INTERVALS OF 1 WEEK

	No. of Children 2 Mos. to 2 Yrs.	Number Immun- ized	Per cent Immun- ized	No. of Children 2 to 4 Yrs.	Number Immun- ized	Per cent Immun- ized
Toxoid 1/2 c.c.....	49	44	89.8	33	31	94
Toxoid with alum 1/2 c.c.....	35	34	97	21	21	100
Toxoid with alum 1/8 c.c.....	43	41	95	13	13	100
Filtrate of Toxoid plus alum 1/2 c.c.....	25	0	100	8	0	100

TABLE VI

A COMPARISON OF DIPHTHERIA TOXIN-ANTITOXIN, TOXOID AND TOXOID WITH THE ADDITION OF 0.2 PER CENT OF ALUM AS AN IMMUNIZING AGENT IN CHILDREN.\* THREE INJECTIONS OF 1 C.C. OF TOXIN-ANTITOXIN AND 0.5 C.C. OF TOXOID WERE GIVEN.

THE INJECTIONS WERE GIVEN AT INTERVALS OF 1 WEEK

Children from 5 to 14 years of age

Immunizing Substance	No. Children	No. Immunized	Per cent Immunized
Diphtheria Toxoid (not toxic)	243	228	93.7
Diphtheria Toxoid (plus alum)	112	110	98.2
Diphtheria Toxin-antitoxin	149	132	90.0

\* The children the results of whose immunization are given in the above tables were cared for in 7 institutions. In order to attempt to make the comparison an accurate one, we selected an equal number of children from each institution for immunization by each of the substances. The children were also of similar age groups ranging from 2 to 14 years.

These were all excellent preparations. The toxoid plus alum gave the best results and the simple toxoid the next.

should know that a toxoid supplied by it is of at least this potency. If the toxoid is diluted it should contain at least 4 antigenic units in the dose advised. Such a toxoid is certainly more potent than toxin-antitoxin. Many believe that 2 injections of such toxoid are sufficient. With 3 injections of 0.5 c.c. each, Tables V and VI, we obtained about 94 per cent of successful results. Volk, of Pontiac, using our preparation, but giving only 2 injections of 0.5 c.c. each, obtained only 83.8 per cent in 246 school children. The retests were made at the end of 8 months. Of the children 23 received only 1 injection, and in these only 47 per cent of success was obtained at the end of 2 months and 63.5 per cent at the end of 8 months. It seems, therefore, that 3 doses are desirable if the dose is limited to 0.5 c.c. With 0.5 c.c. and 1 c.c., a somewhat higher percentage of immunization would be obtained, and even higher with 2 doses of 1 c.c. each; but with these there would be occasionally annoying but not serious reactions. Each person must weigh these facts and decide as to whether the possibility of the increased local reaction is a hindrance to the larger dose. It is important that health officials get the most potent preparations available.

#### MOST DESIRABLE AGE FOR IMMUNIZATION

All are agreed that we wish to treat the children at the earliest suitable age. We found some years ago that infants within a few days of birth did not respond well to injections of toxin-antitoxin. Approximately 2,000 infants were given the first injections on the 2d or 3d day after birth, and in addition 2 more at weekly intervals. There was practically no local or constitutional reaction to the injections, but when 100 of them were retested at the end of 1 year the immunization

was found to be quite disappointing. Recently Schroder has injected groups at ages of 1 month, 2 to 12 months, and over 1 year. With toxin-antitoxin her results were as follows:

No. of Infants	Age when Treated	Age when Retested	Results % Immunized
12	1 month	9 to 11 mos.	75
11	3-7 months	9 to 20 mos.	90
10	1 year	1.5 to 3 yrs.	90
4	1 year (toxoid)	17 months	100

These results taken together with those given me by Blum and shown in Table V, suggest that at 3 months or after, babies are suitable for immunization, so far as their immunity response is concerned. As to the most suitable age, other factors are of importance. In cities the new-born babies are usually immune through the transfer to them before birth of antitoxin from their mothers, while in the country the majority are susceptible. This passive antitoxic immunity lasts 6 to 12 months. For this reason the age chosen in cities as the desirable one is usually 6 to 9 months, while in the country it is usually 6 months. Another reason for waiting until the babies are at least 6 months of age is that very young infants are more apt to suffer from intestinal and other disturbances. Fortunately the earlier in life the toxin-antitoxin or toxoid is given, the less the annoyance—in fact in babies under 2 years an intramuscular injection of toxoid is not usually followed by any appreciable reaction. The toxoid gives on the average a local reaction 25 per cent more severe than does the toxin-antitoxin. Deep intramuscular injections give much less frequent and severe local reactions than subcutaneous ones.

We may sum up as follows: Non-toxic diphtheria toxoid or antitoxin is undoubtedly the best preparation for young children and probably for older ones because it is the most potent and stable immunizing agent. Suitable underneutralized toxin-antitoxin is however an efficient preparation and is only a little less immunizing than toxoid, and it has the advantage of causing less nonspecific reactions in older children. It is to be remembered that in most toxin-antitoxin preparations, the "toxin" is really mostly toxoid, since the toxin has been kept for a year or more. This allows it to become more stable and more efficient. It is difficult to decide which method should be preferred for older children. Each has its advantages. The use of toxoid mixed with lanolin, and rubbed into the skin has a distinct place, as for example, for children in institutions or in cases in which there are objections to the use of the "needle." Alum 0.1 or 0.2 per cent,

added to the toxoid adds to its immunizing power, as is also the case when it is added to toxin-antitoxin, only then to a much less extent.

It is of the greatest importance that the toxoid be made from highly potent toxin and that the antigenic units should be stated on the containers. If it is diluted, this should be stated on the label. Toxin-antitoxin should be properly standardized and have the desired toxicity. In large cities such as New York we find toxin-antitoxin has an advantage, in older children, for the injection acts not only as an immunizing dose, and gives on the average less local reaction, but because it is also a substitute for the Schick test. The exclusion of the negatively reacting children cuts down the number of later injections. For the second and third injections in these older children, either toxin-antitoxin or toxoid may be used.

A Schick retest 3 to 4 months after making the immunizing injections is always desirable but not essential, for only in this way can we be absolutely sure that the desired effect has been obtained. The tables here present some of the evidence upon which our opinions were formed.

NOTE: A part of the expense of this investigation was provided by the Committee on Administrative Practice of the American Public Health Association from an appropriation made to it by the Commonwealth Fund.

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## Premiums to Mothers, Liège, Belgium

TO overcome the indifference of women to prenatal work and to infant health work, the municipal council of Liège, on July 1, 1931, offered premiums of 200 francs each to expectant mothers who attended regularly a prenatal health center or were examined by their own physician at least once before the end of the 6th month of pregnancy and not less than 3 times during the entire pregnancy, and who have had their infants regularly examined either at a health center or by the family physician. The premium is paid 3 months after the birth of the child.—*Oeuvre Nationale de l'Enfance, Revue Mensuelle*, Brussels, July, 1931, p. 776.



# Advantages of Toxoid in Diphtheria Prophylaxis\*

WALTER T. HARRISON

*Surgeon, U. S. Public Health Service ; National Institute of Health,  
Washington, D. C.*

ACTIVE immunization against diphtheria has developed during the past 15 years, particularly in North America, into one of the most important specific measures for the prevention of disease. Prior to the use of toxin-antitoxin mixture, smallpox vaccination was considered the most successful individual specific procedure in preventive medicine; but improvements in methods of diphtheria prophylaxis have been so great in the past few years that one can safely say that immunization against diphtheria is at least as satisfactory as vaccination against smallpox.

Since no one now-a-days questions the effectiveness of immunization campaigns on incidence of diphtheria as reflected in both cases and deaths, it is only necessary to cite in passing the experiences of Auburn, N. Y.,<sup>1,2</sup> Grand Rapids, Mich.,<sup>3</sup> and New York City,<sup>4</sup> without going into detail as to the tremendous reduction in both cases and deaths in these places, for which accurate records are available.

We are familiar with the extreme difficulty experienced by workers in reaching the most highly susceptible children for immunization, and since these children are reached with such difficulty it is important that we use the immunizing agent which will produce immunity in the greatest number of subjects injected. Toxin-antitoxin mixture and toxoid are both being used and we all wish to know which, if either, is the superior product, and the advantages and disadvantages of both.

Toxin-antitoxin mixture is made from mature toxin by adding sufficient diphtheria antitoxin so to decrease its toxicity that it may be safely injected. This delicate balance is readily attained by experienced manufacturers working with toxins and antitoxins, the values of which are accurately known.

In the beginning mixtures were made by adding antitoxin to the undiluted toxin—hence the original mixtures containing from 3 to 5 L + doses of toxin per human dose. Some of us will probably re-

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\* Read at a Special Session on Toxoid Immunization at the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 15, 1931.

member those mixtures with the amber color of broth, which gave in older children and adults local and general reactions of the same general nature as those observed at present in the same age groups with toxoid. These mixtures containing at least 3 L + doses of toxin were used universally until 1922, when the amount of toxin was reduced 30 times, or to the present 0.1 L + mixture. The amount of unneutralized toxin, however, remains the same as in the older mixtures. This small amount of toxin has caused these allergic reactions in older children and adults practically to disappear, but in susceptible individuals the local reaction will always be encountered. In fact, the absence of local redness and swelling, with heat and tenderness, should indicate either that the patient is immune or that the mixture is not of proper toxicity. In very susceptible persons, and with strong mixtures, an occasional general reaction is encountered, with malaise, occasional vomiting, and fever.

The antitoxin used in toxin-antitoxin mixtures up to a few years ago was obtained from immunized horses, but about 1924 evidence began to accumulate that this small amount of horse serum would sensitize a considerable proportion of individuals so that severe serum sickness would follow later therapeutic injections. An occasional case of what could not be differentiated from the phenomenon of Arthus<sup>6</sup> was reported in humans.

Hooker<sup>7</sup> in 1924 showed by specific skin tests that a considerable number of patients who had received toxin-antitoxin mixtures, and no horse serum from other sources, would react to an intracutaneous injection of horse serum.

Gordon,<sup>8</sup> at the Herman Keifer Hospital in Detroit, found that the excessive number of serum reactions following scarlet fever streptococcus antitoxin was probably due to the use of horse serum in a selected group who had received sensitizing injections of toxin-antitoxin mixture. He showed that scarlet fever antitoxin was no more prone to produce unpleasant reactions than diphtheria antitoxin, when given to a child who previously had not received toxin-antitoxin mixture, or other horse serum injections. These data have led the manufacturers to substitute in toxin-antitoxin mixture antitoxin prepared by immunizing goats and sheep, which products are now widely available. In the light of our present knowledge of the sensitizing effect of minute doses of horse serum, and since effective preparations containing goat or sheep antitoxin are available, the use of horse serum toxin-antitoxin mixtures should be discouraged.

Considerable difficulty has been encountered with toxin-antitoxin mixtures with respect to the effect of freezing. Formerly freezing took

place only in the winter in cold climates, but of late the introduction and wide use of automatic refrigeration has increased our difficulties in this direction. Phenol or tricresol-preserved mixtures when frozen either lose their immunizing properties and become totally inert, or become toxic. The increase in toxicity in 0.1 L + mixtures is not sufficient to endanger life, since the original amount of toxin in this formula is not more than 3 to 7 guinea pig m.l.d.'s and a very small proportion of the original amount is released. The increased toxicity, however, is sufficient to produce unpleasant local and general reactions, and may react unfavorably upon a campaign for diphtheria prevention. These mixtures, after having been frozen and thawed, are always turbid or slightly opalescent, due to the precipitated antitoxin which does not again go into solution. Mixtures should be stored in the warmest part of the refrigerator, which usually will be found on the top shelf, at the level of the coils. Mixtures which are not crystal clear should be discarded.

The 0.1 L + mixtures are not particularly stable and should therefore be kept in the refrigerator except when actually being used. Containers which have been removed for use should be returned to the cold as soon as possible. The highly diluted toxin does not retain its activity very long at room temperature—hence, the short expiration date, 6 months from date of manufacture. A shorter date would so interfere with distribution as to render manufacture and distribution very difficult.

The immunizing value of toxin-antitoxin mixture as reported by various workers varies within rather wide limits. Some report as low as 50 per cent successful immunizations following one course of injections as measured by the Schick reaction, while others report as high as 85 per cent. Such wide variations in results by different workers may be due in some part to the tendency of mixtures to deteriorate and to variations in strength of different Schick outfits. Our own experience in the Washington schools, using mixtures at least as active as the average obtainable in the market, yielded 64 per cent successful immunizations from 3 injections. The Schick test toxin was carefully titrated and diluted each day from the bulk. From figures reported by various workers and covering all working conditions it would seem that 70 per cent successful immunizations from 3 injections would be a fair estimate of the general effectiveness of toxin-antitoxin mixture.

Diphtheria toxoid was first applied to the immunization of humans by Ramon, of the Pasteur Institute, in 1923. Ramon has named his product "Anatoxine," but English speaking countries have adopted the name "toxoid" to avoid confusion with *antitoxin*, with the probable unfortunate results which such confusion would cause.

Toxoid is prepared by adding from 3 to 4 c.c. of commercial formalin to toxin, and subjecting the mixture to a temperature of 39° to 40° C. until all toxicity is lost, which usually takes place in from 3 to 6 weeks.

The specifications for toxoid manufactured or sold in the United States are supplied by the National Institute of Health of the U. S. Public Health Service, and, roughly, are as follows:

The toxin before detoxification must contain not less than 400 m.l.d.'s, or 5 L + doses. Detoxification must be so complete that 5 human doses when injected into guinea pigs must show no signs of early or late diphtheria poisoning. The antigenic efficiency must be such that the initial human dose will immunize 80 per cent of guinea pigs in 6 weeks to such a degree that 5 m.l.d.'s of toxin will fail to kill in 10 days. This antigenic value, as measured in guinea pigs, is much greater than that of toxin-antitoxin mixture; as a matter of fact, active toxin-antitoxin mixtures are so toxic for these animals that one strong enough to immunize in 1 c.c. doses kills such a high proportion as to interfere seriously with the antigenic test.

The only protein constituents of toxoid are derived from the meat and peptone used in the broth, together with the products of metabolism of the diphtheria bacillus. It contains no serum of any kind and can, therefore, be given without fear of sensitizing to a later therapeutic dose of serum. Toxoid is very stable; the expiration date is now 18 months from the date of manufacture, and data are accumulating which may justify the extension of this period. Freezing does not seem to change it, and no physical or chemical treatment yet applied has succeeded in restoring any degree of toxicity.

As with all new products, doses of various sizes and to be given at different intervals have been suggested. Most manufacturers in the United States supply the material in packages containing 2 doses of 1.0 c.c. each and recommend an interval of from 3 to 4 weeks between doses. Since immunity depends upon the presence of diphtheria antitoxin in the blood of the subject, and as the formation of antitoxin is a slow process, better results should be obtained by using the longer interval. There is considerable experimental evidence, first presented by Glenny and Sudmersen,<sup>1</sup> which indicates that second doses given after an interval sufficient to permit a maximum reaction from the first will result in a larger response than if both doses are given with a shorter interval. In our work in Washington we found that the interval of 1 month gave very good results and was also convenient from the administrative viewpoint. The question of dosage and interval between doses will, no doubt, work itself out without difficulty as more

and more of the material is used by different workers. Two doses with the 30-day interval certainly will produce better immunity than 3 doses of toxin-antitoxin mixture given at intervals of 1 week.

The only obstacle in the way of the universal use of toxoid is the tendency to cause local and general reactions in older children. These reactions are allergic in nature and all are agreed that they are only unpleasant and never dangerous. Practically all young children give absolutely no local or general reaction, the trauma of the injection being all that can be seen. These are the individuals most susceptible to diphtheria, and it is in this group that any prophylactic measure finds its greatest usefulness. In the registration area in the United States for 1928 there were 8,263 deaths from diphtheria, of which 60 per cent were in children under 5 years of age; of this group, the 1st, 2d, and 3d years furnished the largest number of deaths. It is probably a conservative statement that the immunization of 1 child in the first 5 years of life is equal in its effect upon the diphtheria death rate to the immunization of 3 school children.

Older children and adults may be immunized with toxoid, but it is good practice to test for sensitiveness to the diphtheria proteins before the immunizing injections are begun. This test may be carried out either alone or as a control for the Schick test. A small vial of diluted toxoid 1 in 20 is furnished by the manufacturers, and 0.1 c.c. is inoculated intracutaneously, as for the Schick reaction. A local area of redness at the site of the inoculation more than  $\frac{1}{2}$  inch in diameter appearing within 3 days is interpreted as a positive reaction, and indicates that the individual may give a local or general reaction to toxoid. These persons may receive toxoid in smaller doses, the first dose ranging from 0.2 to 0.5 c.c. of the 1:20 dilution, depending upon the degree of reaction to the intracutaneous test. Subsequent doses may be given at intervals of 2 weeks, and may be doubled if the local reaction from the preceding dose was not more than  $\frac{3}{4}$  inch in diameter. Reactions up to 3 inches in diameter call for a repetition of the first dose, while more severe reactions should cause the subsequent dose to be reduced. According to Defries,<sup>9</sup> these reactors are more easily immunized than individuals who are not sensitive to the diphtheria protein.

The use of the preliminary Schick test in the older school children will enable the worker to eliminate an increasing number of immunes from the group to be immunized as the age increases, and when only 2 doses of toxoid are required as compared with 3 doses of toxin-antitoxin mixture, the worker will be required to see the subject the same number of times as when giving toxin-antitoxin mixture without preliminary test. Only a very selected group of adults will require im-

munization, those coming in close contact with cases of diphtheria—e.g., nurses, internes, and hospital attendants—and these would in the ordinary course of events be Schick-tested prior to immunization. Adults who fail to react to toxoid given intracutaneously may for purposes of immunization be considered in the same class as infants.

A surprisingly small number of controlled experiments using toxoid and toxin-antitoxin mixtures have been done. Some rather extensive work is now in progress and additional information on the relative value of the two products in actual use should soon be available.

Dick and Dick" report comparative results with toxin-antitoxin mixture and toxoid in 2 groups of 100 each, consisting mostly of adults. Five doses of toxin-antitoxin mixture, beginning with 0.5 c.c. and followed by 4 doses of 1.0 c.c. each at weekly intervals, produced a negative Schick reaction in 82 per cent after 3 months. Three doses of toxoid—the first 0.5 c.c. followed by 2 doses of 1.0 c.c. each with intervals of 3 weeks between doses 1 and 2, and 15 days between doses 2 and 3—produced 94 per cent negative Schick reactions in 6 weeks. They conclude that 3 doses of toxoid are more effective than 5 doses of toxin-antitoxin mixture.

Adams," reporting for 1926–1927 in the Canadian cities adjoining Detroit, states that among 11,000 children who had received 2 doses of toxoid the diphtheria rate was 1.55 per 1,000, while for the same period among 9,000 controls the rate was 11.44 per 1,000, and that at the ages 7 years and younger there were no reactions worth mentioning.

Ramon and Helie" state that 3 doses of toxoid—0.5, 1.0, and 1.0 c.c. with intervals of 3 weeks between the first and second doses, and 15 days between the second and third doses—will immunize more than 90 per cent children and adults.

Dr. Sumner" of the Webster Parish Health Unit, Minden, La., states that he has used toxoid in immunizing approximately 2,000 persons—2 doses each—without unfavorable reactions having been brought to his attention. These subjects ranged from 6 months to 23 years, with the greatest number included in the years 6 to 16.

Schwartz and Janne," reporting on about 14,000 children in the Milwaukee schools, retested after 3 doses of toxin-antitoxin mixture, state that from 62 to 85 per cent were negative to the Schick test; 104 preschool children immunized with toxin-antitoxin mixture prepared from sheep antitoxin showed 71 per cent Schick negative after 6 months. Ninety-three children were injected with 3 doses of toxoid, interval of 3 weeks between doses, and 1.0 c.c., with an interval of about 3 weeks between doses; the admixt were rendered Schick negative. Reactions were absent in between do and school children up to 7 years.

In Washington<sup>18</sup> we compared commercial toxin-antitoxin mixtures and commercial toxoids among school children (ages 5 to 16 years), with a few preschool children under 5 years of age. The materials used were not selected from highly antigenic lots but were chosen as routine manufacturers' samples. The Schick test material was prepared at the National Institute of Health, and the same lot was used both for the preliminary and post-Schick tests. Three doses of toxin-antitoxin mixture were given with an interval of 1 week between doses. Of 355 children tested after 104 to 195 days, 64 per cent were Schick negative. To 86 children 3 doses of toxoid were given—0.5, 1.0, and 1.0 c.c., with an interval of 1 week between doses; 92 per cent were Schick negative after 133 days. Two doses of toxoid of 1.0 c.c. each were given to 318 children, with an interval of 31 days, and after 119 days, 94 per cent were Schick negative. Seventy-two children received 2 doses of toxoid, 1.0 c.c. each with an interval of 42 days, and after 99 days all but 1 were Schick negative. Thus, of 475 children retested from 90 to 133 days after receiving toxoid, 95 per cent were Schick negative compared with 64 per cent of 355 children who received toxin-antitoxin mixture.

The preliminary Schick test was controlled with toxoid 1:20, and all children reacting to this intracutaneous test were injected with toxin-antitoxin mixture. There was therefore no local or general reaction in any child who received toxoid. It is very apparent from these figures that toxoid in 2 doses with an interval of 1 month will immunize from 20 to 30 per cent more children than will 3 doses of toxin-antitoxin mixture at weekly intervals.

Any non-toxic, non-sensitizing antigen which will give such excellent results certainly deserves the attention of the health worker, particularly since its use is followed by so little local or general disturbance in the age group which most critically needs immunization.

For children up to and including 7 years, toxoid may be used without previous test with the expectation that occasionally local reactions will occur, and very infrequently a general reaction, with headache, fever, malaise, will also be encountered. These reactions are also seen when using toxin-antitoxin mixture, but are not given so much attention, probably because a reaction of some sort is seen in all. Children over 7 may be tested for hypersusceptibility to toxoid, and those showing no reaction, or reactions less than  $\frac{1}{2}$  inch in diameter, may be given toxoid in full doses. Reactors—those giving a local reaction to the toxoid test—may be immunized with reduced doses of toxoid. As additional reports are received from workers who use toxoid in school children up to 10 or 12 years without previous test, and with only

negligible reactions in those over 8, the test for hypersusceptibility to toxoid will, no doubt, be discontinued. Until this time arrives, and pending our acquiring a greater familiarity with toxoid, we will probably continue to test the older children.

Briefly, the advantages of toxoid over toxin-antitoxin mixture may be summarized as follows:

1. It is from 20 to 30 per cent more effective, even when only 2 doses are given.
2. It contains no serum or other animal protein likely to sensitize to a later therapeutic serum injection.
3. It is absolutely without local or general reaction in practically all children under 7 years of age. Reactions in older children and adults are only unpleasant, not dangerous.
4. It contains no free toxin.
5. It is more stable, retaining its effectiveness for a longer period, and is not affected by freezing.

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# Experiences with Diphtheria Toxoid in Canada<sup>\*</sup>

J. G. FITZGERALD, F. A. P. H. A., R. D. DEFRIES, F. A. P. H. A.,  
D. T. FRASER, P. J. MOLONEY, AND N. E. MCKINNON

*University of Toronto, Toronto, Canada*

VACCINATION against diphtheria in Canada, as elsewhere, is of recent origin. The employment of Ramon's anatoxin or diphtheria toxoid, as it is more widely known in the United States and Canada, dates back to 1925. Prior to that time diphtheria toxin-antitoxin mixtures had been used in a few communities in Canada, chiefly in the provinces of Ontario and Saskatchewan, on a moderate scale. Beginning in the autumn of 1924 laboratory investigations confirmed the observations of Ramon that this material was, if prepared according to the directions of Ramon himself, (a) quite innocuous, if employed in proper doses, (b) highly antigenic, and very stable ( $60^{\circ}$  C. for 3 hours), (c) quite readily prepared, if supplies of potent diphtheria toxin were available for the purpose, and (d) susceptible of reasonably satisfactory assay by means of protection tests using lethal doses of diphtheria toxin, in guinea pigs; skin tests in rabbits or guinea pigs; or by means of the flocculation test of Ramon.

This incomplete list of the advantages which toxoid possesses may be supplemented by the statement that results obtained in the vaccination of a group of young adults revealed the fact that the immunizing qualities of this prophylactic were as readily demonstrable in human beings as in experimental animals.

Upon the completion of this preliminary work, arrangements were made in a number of centers for more extended use of diphtheria toxoid prepared in the Connaught Laboratories. These further trials, notably in Hamilton, Windsor, and Brantford, Ontario, were eminently successful. Very quickly the use of toxoid spread to other parts of Canada and soon its employment upon a large scale was undertaken. This very satisfactory state of affairs has continued, and in the past 6 years sufficient toxoid for the vaccination of over 1,000,000 persons has been distributed in the Dominion.

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<sup>\*</sup> Read at a Special Session on Toxoid Immunization of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 15, 1931.

Since the methods of preparation and testing are well known and have previously been presented in meetings of this Association, they will not be dealt with at this time. However, certain additions to knowledge of the subject which it is believed have accrued from studies carried on in this country seem worthy of brief reference. In this category may be included the observations which have revealed the fact that it is possible to adjust the dose of toxoid so that local and general reactions of any degree of severity can practically be avoided. From the outset, insistence upon the importance of early vaccination against diphtheria has been frequently reiterated. The time of election is the preschool age period and any time after the 1st year of life seems to be suitable. Again, a thoroughly critical appraisal of the results of large scale employment of toxoid has recently been made in Canada. The results of these studies of McKinnon, Ross and Defries have recently been published. Quantitative estimation of the antigenic response to injections of toxoid has been carefully recorded by Drs. Donald T. Fraser and P. J. Moloney and Miss C. J. Fraser. It is desirable, perhaps, to deal at a little greater length with some of the points above referred to.

In the period 1921-1924 in Canada, diphtheria ranked first as a cause of death of the age group 2-14 years. It accounted for over 15 per cent, or 1 in every 7 of the deaths in that age group. The annual mortality rate per 100,000 population varied from 14 to 23. The number of deaths in a year varied from 1,281 to 2,072. In general, throughout Canada the mortality rate has been falling during the past 30 years while the morbidity rate has remained practically stationary. It is highly significant that approximately one-quarter of the cases and one-half of the deaths occur in the age group under 5 years.

When toxoid was first distributed in Canada, 2 doses were recommended. Blood titration for antitoxin content, however, showed that 2 doses produced  $1/25$  unit or more of antitoxin per c.c. of serum in 70 per cent of the vaccinated persons. This finding led to the addition of a third dose which, as will be shown, increased the percentage to a satisfactory level. Blood titration in various groups has shown that 3 doses result in the production of  $1/25$  unit of antitoxin in fully 90 per cent.

As mentioned previously, the recognition and detection of persons who might react unfavorably to toxoid was rendered possible by the introduction of the reaction test by Moloney. Further work has shown that such individuals are readily immunized without accompanying reactions if given graduated doses of toxoid.

The material used in the reaction test is suitably diluted toxoid.

One-tenth c.c. is injected into the skin of the forearm. The size and degree of the reaction in 24 to 48 hours is an index of the reaction which may be expected if prophylactic doses of toxoid are given. The test is used as a gauge of the individual's sensitivity to toxoid. For convenience the readings of these tests are recorded as 1 +, 2 +, or 3 +; 1 + signifies an area of redness no greater than 1 cm.; 2 + an area of redness greater than 1 cm., but with little or no induration; 3 + indicates definite induration at the site of the injection. Canadian experience, notably that of Burke and his colleagues, has shown that individuals who exhibit a negative, or a 1 + reading, can be given the regular dosage of toxoid without question. Those showing a 2 + reading should be given smaller doses, and the few showing a 3 + should be given a specially diluted toxoid. To facilitate the immunization of such markedly sensitive individuals, suitably diluted toxoid is now distributed in Canada. In over 30,000 children in Toronto, in whom the reaction test readings were recorded, the vast majority, 84 per cent, had no reaction or at most a very slight one. These school children were given the regular dosage without showing subsequent reaction. Five per cent of this large group showed a 2 + reading. These were given smaller doses without producing significant reactions. The readings in these 30,000 children show too that the degree of reaction to the reaction test, and therefore to toxoid, varies with age. In pre-school age children, a very small percentage showed any reaction to the test and none showed redness of any significant degree. As the child grows older and perhaps becomes sensitized by contact in a diphtherial environment, he is more likely to show reaction. Of those in the school age group of 5-14 years, 10 per cent exhibited a 3 + reading, this being confined chiefly to the older children. Our experience has also shown that those who do present reaction to the test are more readily immunized than others, so that very small doses of diluted material serve in the vast majority to bring the antitoxin content up to the requisite level.

The results of toxoid immunization can be measured in three ways:

1. By testing (Schick tests or blood titration)
2. By comparing the amount of diphtheria in a group of adequate size who have received toxoid, with the amount of diphtheria in a group of the same age distribution and living under similar conditions but not given toxoid
3. By comparing the morbidity and mortality rates in a community before and after the use of toxoid

Blood titrations before and after immunization have shown that in individuals who had less than 1/50 unit before immunization, 90 per cent had 1/25 unit or more antitoxin after receiving 3 doses of toxoid.

In the analyses of the diphtheria cases which occurred in 16,829 Toronto school children who were given 3 doses of toxoid, 0.5 c.c., 0.5 c.c. and 1 c.c. at intervals of 3 weeks, and 8,994 who were given 2 doses of toxoid, 0.5 c.c. each with a 3-weeks interval, and observed for a period from 1 to 3½ years, it has been estimated that during the period of observation, had diphtheria occurred in the treated children at the same rate as in the control group of the same age and under the same conditions of exposure, namely, that of the public school, there would have been expected 222 cases in those given 3 doses of toxoid. There were actually 23 cases reported and among these not one death occurred. This is a reduction of 90 per cent for the whole period. In the first year following immunization the reduction in diphtheria was from 95 to 100 per cent. In the 8,994 children given 2 doses, 200 cases might have been expected; 52 were reported, a reduction over the whole period of 74 per cent. An interesting parallelism between the antigenic response in individuals vaccinated with toxoid and the degree of community protection against diphtheria which resulted is evident in the above figures. The results of the assays of the serums of those given 2 doses of toxoid showed that about 70 per cent were immune and the statistical evidence indicates a reduction in diphtheria mortality in that group of 74 per cent. Furthermore the percentage of individuals immunized when 3 doses of toxoid were given, as determined by blood titrations, was 90 per cent and the reduction in diphtheria mortality in the group of Toronto school children was 90 per cent.

The results in Hamilton, with a population of 150,000, and Brantford, with a population of 18,000, may be quoted as examples of municipalities that have practically eliminated diphtheria. Other experiences such as that in Windsor might also be quoted. Data from the province of Manitoba recently presented by Dr. F. W. Jackson suggest that widespread immunization in that province is a factor which accounts for the unprecedentedly low figures of diphtheria in the past year and the first months of this year.

The efficiency and practicability of toxoid, properly prepared, as an immunizing agent against diphtheria, is established.

# Degree of Immunization from Injection of Diphtheria Toxoid\*

(a) of Different Strength Toxoids (b) at Varying Intervals (c) of Treated Toxoids

O. R. POVITZKY, M. D., DR. P. H.

*Bureau of Laboratories, Department of Health, New York, N. Y.*

BECAUSE the introduction of practical administration of diphtheria toxoid is quite recent we have not as yet arrived at a definite dosage for immunization against diphtheria. The National Institute of Health in Washington has issued definite minimum requirements for the production and administration of toxoid, namely: the original toxin should not contain less than 5 L + per c.c.; the maximum dose should not exceed 1 c.c. of the undiluted toxoid. The toxoid must protect at least 80 per cent of guinea pigs for 10 days when injected with the initial human dose against 5 m.l.d.'s.

While these requirements are a great safeguard against conversion of worthless toxins into toxoids, we are still in the dark as to the exact dosage of toxoid required for immunization. Ramon's experience has been with toxoids of at least 10 antigenic units per c.c. He obtained immunity in 95-98 per cent of cases by giving 0.5 c.c., 1.0 and 1.5 c.c. of toxoid at intervals of 3 weeks after the first and 2 weeks after the second injection. Park is giving 3 injections of 0.5 c.c. of our toxoids which also average around 10 antigenic units. Other workers report more or less favorable results describing the quantities of the toxoid administered in cubic centimeters and at different intervals, but seldom mention the strength of the toxoid. We may in time be able to decide what minimum dosage of toxoid will insure adequate immunity. But in order to define this amount the toxoids should be standardized by the number of antigenic units per c.c., and the workers should tabulate their results according to the antigenic units administered.

Fortunately we have a very effective means of establishing such a unit † in the Ramon flocculation test, Ramon<sup>1</sup> found how uniform such

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† Schmidt of Copenhagen suggests the unit be called "Immunizing Unit" (U.I.) in distinction from Antitoxic Unit (U.A.).

a standard could be, when he tested 11 lots of toxoids prepared in different laboratories from various parts of Europe. His results by this test agreed very closely with those of Schmidt of Copenhagen. The same results were obtained with both the French and Danish antitoxins.

#### RAMON FLOCCULATION TEST

Because many readers may not be familiar with it, the author thinks it necessary to describe briefly this important test which is gradually replacing the use of guinea pigs in immunization work in diphtheria. In 1922 Ramon of the Pasteur Institute in France introduced a practical and simple method of standardizing diphtheria toxins and antitoxins by means of the test tube.

The test is based on the previously found principle that when toxin is brought in contact with antitoxin in suitable proportions, namely, to effect a neutralization or a saturation, a reaction occurs. This manifests itself first in clouding up of the mixture, then formation of flocculi, which finally fall to the bottom, leaving the supernatant fluid clear again. The test is set up with varying amounts of antitoxin and equal amounts of toxin per tube—usually 1–4 c.c., depending on the strength of either the toxin or antitoxin. The test is kept at the water bath at 55° C. For titrating toxin or toxoid a standardized antitoxin is used; for titrating antitoxin, a standardized toxin. The first tube which shows a reaction is called the "*indicating tube*" and corresponds to the neutralized or saturated mixture. From the amounts of toxin and antitoxin which enter into this reaction, the titer of either the toxin or toxoid as to the number of antigenic or flocculating units per c.c., or of the antitoxin as to the number of antitoxic units per c.c., is calculated. No reaction occurs with an excess or too small amounts of antitoxin to effect a neutralization. But reactions do occur on either side of the *indicating* mixture later on, when the amounts of antitoxin are on the borderline for neutralization. It is therefore important to watch carefully for the *first tube* showing the reaction, because this is the *specific* reaction and usually corresponds with that in the guinea pig, as far as the L + dose or antitoxic units are concerned.

For titration of toxoids, this test is invaluable. The toxoids show the same titer by flocculation test as the original toxin, though the time for the reaction is slightly delayed. The present standard of the National Institute of Health in Washington calls for the minimum of 5 L + doses per c.c. of the original toxin. This should correspond conservatively to at least 5 antigenic or flocculating units in the resultant toxoid by the Ramon test. In examining the products from different manufacturers on the market, the author found that one toxoid showed 6.8 to 7 antigenic units; one showed 4.4 and one 4.2 antigenic units per c.c. Two (diluted) showed no antigenic units by flocculation. One (non-diluted) showed no flocculation though kept in the waterbath almost a week. It is against such variations we have to

guard. The flocculation test tells us promptly whether the toxoid conforms to the requirements from Washington as far as the value of the original toxin goes.\*

Since 1924 we have been constantly guided by the Ramon flocculation test<sup>2</sup> in all phases of toxin, toxoid, and antitoxin production work for the testing of antigenic or antitoxic units. We follow the progress of our toxins<sup>3</sup> from day to day by this test, and convert a toxin into a toxoid<sup>4</sup> only when it gives a flocculation reaction with our standard antitoxin in the proper proportions in from  $\frac{1}{2}$  to  $\frac{3}{4}$  hour. The promptness of the reaction in the freshly prepared toxin is dependent on the number of L + doses per c.c. and in the toxoid on the number of antigenic units per c.c. An antigenic unit has the ratio of 1:1 to the antitoxic unit. If, say, 11 antitoxic units produce the specific flocculation with 1 c.c. of the toxin or toxoid—1 antigenic unit is equal to 1/11 and 1 c.c. of the toxin or toxoid to 11 units. The weaker the toxin or toxoid, the more delayed the reaction. The reaction is also delayed with concentrated toxoids and it is sometimes necessary to blend it with the crude toxoid for the test and then estimate the titer. The slowness or promptness of the reaction of the antitoxin on the other hand, is not dependent on the antitoxic units, but is a characteristic of the horse, and this is maintained throughout the immunization period. It is well to keep this fact in mind in following up the progress of immunization in horses. The discrepancies between guinea pig and the Ramon test reported by different authors, including the writer, are usually due to the wrong proportions between toxin and antitoxin. Since 1925<sup>5</sup> when the characteristic of the horse as to the slowness or promptness of reaction was noticed, our results have been more reliable and specific. When a serum gives a reaction at the usual temperature with the standard toxin in 2, 3 or more hours, when it should give it in 1 hour, we know that the amounts of toxin and antitoxin are not proportionate. The test is repeated several times until the reaction is obtained within the proper time. The Ramon test, when the amounts of toxin and antitoxin are proportionate, is, in the opinion of the author, one of the most reliable we have. The reactions which occur later on either side of the indicating tube are not specific and may lead to wrong calculations.

We are guided by the Ramon test in preparing mixtures of toxoid with different percentages of alum. In the purification of toxoids

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\* In our opinion the requirements of the National Institute of Health for the potency of the toxoid are inadequate. Toxin-antitoxin is of necessity given very cautiously and the demand for protection against 5 m.l.d's. cannot be exceeded. This is not true of toxoid and a much higher standard for protection can be required. At present the producer can ignore the initial requirements or greatly dilute a good toxoid to the minimum of antigenic units and still comply with the requirements from Washington as far as the final product is concerned.

TABLE I

COMPARATIVE TESTS IN THE PRODUCTION OF IMMUNITY IN THE GUINEA PIG WITH ONE DOSE OF DIFFERENT TOXOIDS AFTER 6 AND 7 WEEKS

Toxoid 903 Dose 0.5 c.c. 5.9 Antigenic Units per c.c. <i>Tested after 6 weeks</i>					Toxoid 901 Dose 0.5 c.c. 7.6 Antigenic Units per c.c. <i>Tested after 6 weeks</i>				
No. Pigs	No. m.l.d.	Survived	Dead	Day Died	No. Pigs	No. m.l.d.	Survived	Dead	Day Died
3	5	1	2	3rd	3	5	2	1	3rd
5	7.5	1	4	3rd	2	7.5	1	1	3rd
3	10	3	0	2nd	2	10	1	1	2nd
<i>After 7 weeks</i>					<i>After 7 weeks</i>				
1	10	0	1	3rd	2	15	1	1	3rd
2	15	1	1	3rd	—	—	—	—	—
14 <i>Total</i>		6	8		9 <i>Total</i>		5	4	

Toxoid 892 Dose 0.5 c.c. 11.6 Antigenic Units per c.c. <i>Tested after 6 weeks</i>					Solution Toxoid Antitoxin Flocculi Dose 0.25 c.c. 22 Antigenic Units per c.c. <i>Tested after 6 weeks</i>				
No. Pigs	No. m.l.d.	Survived	Dead		No. Pigs	No. m.l.d.	Survived	Dead	
5	5	5	0		2	5	2	0	
2	7.5	2	0		1	10	1	0	
6	10	3	3	2 died	3	15	2	1	
4	15	4	0	septicemia	3	20	0	3	
<i>After 7 weeks</i>									
1	30	1	0						
1	40	1	0						
19 <i>Total</i>		16	3		9 <i>Total</i>		5	4	

done by Reiner, all fractions; washings, dialyzate, residue and final product were tested by the author either directly or by blending with the crude toxoid by flocculation. As little as 1 antigenic unit can be detected after a prolonged time.

The present studies with guinea pigs are undertaken with a view to the following points: (1) The effect on immunity with a single dose of toxoids of different strength; (2) the same dose divided into 2 or 3 portions given 1 week apart; (3) the same divided dose given 3 weeks after the first injection and 2 weeks after the second injection; (4) the effect on immunization of a solution of toxoid-antitoxin flocculi; and



TABLE II

COMPARATIVE TESTS WITH TOXOID 901 WHEN GIVEN WITH ONE SINGLE DOSE OR SAME DOSE DIVIDED INTO 2 OR 3 DOSES. ALSO WHEN SAME DOSES ARE GIVEN 1 WEEK APART OR 3 AND 2 WEEKS APART

Toxoid 901 1 Dose 0.5 c.c. = 3.8 Antigenic Units							
Tested after 6 weeks				After 7 weeks			
No. Pigs	No. m.l.d.	Lived	Dead	No. Pigs	No. m.l.d.	Lived	Dead
3	5	2	1	2	15	1	1
2	7.5	1	1				
2	10	1	1				

Toxoid 901—2 doses one week apart Tested 6 weeks after 1st inoculation					Toxoid 901—Given 3 weeks after 1st dose				
No. Pigs	No. m.l.d.	Lived	Dead		No. Pigs	No. m.l.d.	Lived	Dead	
2	10	2	0	Dose 1/4 c.c. 1/4 c.c. Total 3.8 antigenic units. Tested 6 weeks after 1st inoculation.	2	10	2	0	Dose 1/4 c.c. 1/4 c.c. Tested 6 weeks after 1st inoculation.
2	15	2	0		2	15	2	0	
1	20	0	1		2	20	2	0	
1	40	0	1		1	30	1	0	
					1	35	0	1	
					1	40	1	0	
3	20	1	2	Dose 1/4 c.c. 1/8 c.c. Total 2.9 antigenic units. Tested 7 weeks after 1st inoculation.	3	20	2	1	Dose 1/4 c.c. 1/8 c.c. Tested 7 weeks after 1st inoculation.
5	25	3	2		2	25	0	2*	
6	30	3	3		5	30	3	2*	
4	40	0	4		5	40	3	2	
24 Total		11	13		24 Total		16	8	

Toxoid 901—3 doses 1/4 c.c. 1/8 c.c. 1/8 c.c. Given 1 week apart. Total 3.8 antigenic units Tested 7 weeks after 1st inoculation					Toxoid 901—3 doses 1/4 c.c. 1/8 c.c. 1/8 c.c. given 3 weeks after 1st and 2 weeks after 2nd inoculation Tested 7 weeks after 1st inoculation				
No. Pigs	No. m.l.d.	Lived	Dead		No. Pigs	No. m.l.d.	Lived	Dead	
3	25	0	3		2	25	2	0	
4	30	1	3		4	30	3	1	
5	40	2	3		2	40	2	0	
2	50	0	2		3	50	3	0	
					4	60	2	2	
14 Total		3	11		15		12	3	

\* One of each died of septicemia.

TABLE III

TOXOID 892—11.6 ANTIGENIC UNITS PER C.C.

One dose 1/2 c.c.—5.8 antigenic units										
No. Pigs	No. m.l.d.	Survived	Dead	Day						
5	5	5	0							
2	7.5	2	0							
6	10	3	3	2nd	2 died septicemia					
4	15	4	0							
	<i>After 7 weeks</i>									
1	30	1	0							
1	40	1	0							
19 Total		16	3							

Same 2 doses 1/4 c.c. 1/4 c.c. one week apart Total 5.8 antigenic units						Same 1/4 c.c. 1/4 c.c. 3 weeks after 1st inoculation				
No. Pigs	No. m.l.d.	Survived	Dead	Day		No. Pigs	No. m.l.d.	Survived	Dead	
2	10	1	1	2nd	Septicemia	2	15	2	0	Tested 6 weeks after 1st inoculation
2	20	2	0			2	20	2	0	
2	25	1	1	5th	Lungs septicemia	2	25	2	0	
1	40	0	1	3rd		1	30	1	0	
						1	35	1	0	
						2	40	2	0	
						1	50	1	0	
7 Total		4	3			11 Total		11	0	

Same 3 doses 1/4 c.c. 1/4 c.c. 1/8 c.c. one week apart Total 7.3 antigenic units						Same 3 doses 1/4 c.c. 1/4 c.c. 1/8 c.c. 3 weeks after 1st and 2 weeks after 2nd inoculation				
No. Pigs	No. m.l.d.	Survived	Dead	Day		No. Pigs	No. m.l.d.	Survived	Dead	
3	15	2	1			2	15	2	0	
3	20	3	0			2	20	2	0	
3	25	3	0			2	25	2	0	
1	40	0	1			1	40	1	0	
1	50	1	0			2	50	2	0	
1	60	1	0			1	60	1		
12 Total		10	2			10 Total		10		

(5) the effect of toxoid purified by precipitation with alcohol (Reiner's Method).

The solution of toxoid-antitoxin flocculi was prepared according to

the method of Ramon, Legroux and Schoen." This is a process of extracting antigen from the flocculated mixture of toxoid-antitoxin. The flocculated mixture was centrifuged, washed with physiological salt solution, again centrifuged, then dissolved in distilled water 4 times less than the original volume, and heated to 82° C. for 20 minutes.

The resulting concentrated and purified antigen (most of nitrogen is removed) is claimed by the authors to possess all the characteristics of a toxoid, namely, thermostability, irreversibility, specificity, flocculating and immunizing power, and presents dissociation phenomena in the presence of an L o dose. As will be seen from the tables, the solution of flocculi gives quite good immunity in the guinea pig though not in proportion to its antigenic units as compared with the crude toxoid. But because it gives very little reaction in the adult human, it could be used in the proper dosage as an antigenic agent in selected cases. The toxoid purified by precipitation with alcohol, gives too severe reactions in the human to be considered in its present state as a substitute for the unconcentrated toxoid.

The accompanying tables are illustrative of the results on the points discussed. Table I shows that with an equal dose of different toxoids, the degree of immunization increases with the number of antigenic units per c.c. of the toxoid. Thus toxoid 892 containing 11.6 units is far superior to toxoids 901 and 903 containing 7.6 and 5.9 units respectively. Seven weeks after the injection the guinea pigs receiving  $\frac{1}{2}$  c.c. of toxoid 892 survived 30 and 40 m.l.d.'s while only some of those injected with the others survived 15 m.l.d.'s.

Table II shows that the same dose of 901 (7.6 antigenic units per c.c.) when given in 2 and 3 portions 1 week apart confers more immunity than the single dose of 0.5 c.c. or even less (0.25 or 0.125 c.c.). The degree of immunity is still more enhanced when the same divided doses are given 3 weeks after the first and 2 weeks after the second injection.

Table III demonstrates the same principle with the stronger toxoid 892 (11.6 antigenic units) though not to the same degree as the weaker.

Table IV illustrates the degree of immunity conferred by the solution of toxoid-antitoxin flocculi. Compared to the immunity conferred by toxoid 892, which was given in 5.8, 5.8 and 7.3, totalling 18.9 antigenic units, the solution of flocculi does not show up so well with 5.5, 8.3 and 11.0, totalling 24.8 antigenic units.

Table V shows some of the dissociation phenomena of toxoid 892 (11.6 antigenic units per c.c.) and the solution of toxoid-antitoxin flocculi in different quantities in the presence of an L o dose. The results with the solution of toxoid flocculi would prove Ramon's con-

TABLE IV

SOLUTION TOXOID-ANTITOXIN FLOCCULI (WASHED, DISSOLVED IN DISTILLED WATER AND HEATED AT 82° C. 20 MINUTES)

22 ANTIGENIC UNITS PER C.C. BY FLOCCULATION

One dose 1/4 c.c.—5.5 antigenic units						
No. Pigs	No. m.l.d.	Survived	Died	Day		
2	5	2	0			Tested 6 weeks after 1st inoculation
1	10	1	0			
3	15	2	1			
3	20	0	3	2nd	2 died of septicemia	
Two doses 1/4 c.c. and 1/8 c.c. given 3 weeks after 1st inoculation—Total 8.3 antigenic units						
No. Pigs	No. m.l.d.	Survived	Died	Day		
2	5	2	0			Tested 7 weeks after 1st inoculation
1	25	1	0			
1	30	0	1	2nd		
3	40	3	0			
3	50	1	2	2nd	1 had solid lungs	
Three doses 1/4 c.c. 1/8 c.c. 1/8 c.c.—2nd dose 3 weeks after 1st, 3rd dose 2 weeks after 2nd— Total 11 antigenic units						
No. Pigs	No. m.l.d.	Survived	Died	Day		
3	40	2	1	Next day	Septicemia	3 symptoms of septicemia Peritoneal abscess in one. Second died 8th day
6	50	1	5	Next day		
4	60	2	2	Next day		

TABLE V

DISSOCIATION PHENOMENONS WHEN TOXOID AND SOLUTION OF TOXOID-ANTITOXIN FLOCCULI, RESPECTIVELY, ARE ADDED IN DIFFERENT QUANTITIES TO AN L O MIXTURE

Quantity of toxoid of 11.6 antigenic units per cubic centimeter added to the L o dose	Fate of guinea pigs injected with this mixture	Quantity of solution toxoid flocculi of 22 antigenic units per cubic centimeter added to the L o dose	Fate of guinea pigs injected with this mixture
L o dose—1 c.c.	Died in 3 days	L o dose—1/2 c.c.	Died in 3 days
1 c.c.	Died in 4 days	1/2 c.c.	Died in 7 days
1/2 c.c.	Died in 7 days	1/3 c.c.	Died in 3 days
1/2 c.c.	Died in 8 days	1/3 c.c.	Died in 8 days
1/30 c.c.	Died in 2 weeks	1/30 c.c.	Alive after 2 weeks
1/30 c.c.	Died in 2 weeks	1/30 c.c.	Alive after 2 weeks

tention that this preparation has all the characteristics of toxoid.

Unfortunately we had very bad luck with guinea pigs this year. Fully three-quarters of them died of septicemia before we had a chance to test them. Still as all the animals were subjected to the same conditions, the comparisons are pretty fair. In the dissociation phenomena with toxoid and the solution of toxoid flocculi the death of the animal was rather delayed compared with the results given by Ramon. It was due probably to the fact that the L<sub>0</sub> dose was prepared with a fresh toxin and promptly flocculating antitoxin (25 minutes). When the toxoid and solution of toxoid flocculi, respectively, were added to the L<sub>0</sub> dose after standing 15 minutes a more stable union between the toxin and antitoxin might have taken place and a smaller quantity of toxin consequently liberated than when a slowly reacting antitoxin was employed. Ramon<sup>7</sup> mentions the same occurrence when he used a promptly flocculating antitoxin. These facts would prove Madsen and Schmidt's contention that a promptly flocculating antitoxin had a greater therapeutic effect than a slowly flocculating one. More work is in progress on this point.

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## Cuba Honors Dr. Finlay

THE 98th Anniversary of the birth of the noted Cuban bacteriologist, Dr. Charles John Finlay, was celebrated by a ceremony under the auspices of the Department of Health of Havana on December 3. This took place in the open court of the Department's building, where a statue of Dr. Finlay was erected some years ago.

# The Preparation of Stabilized Schick Toxin\*

P. J. MOLONEY AND EDITH M. TAYLOR

*Connaught Laboratories, University of Toronto, Toronto, Canada*

HERETOFORE in carrying out the Schick test it has been necessary, on account of the instability of diphtheria toxin diluted with saline, to dilute the toxin just prior to the test. Apart from the inconvenience of this procedure, there is always the possibility of error, due either to inaccuracy in the measurement of small amounts of undiluted toxin or to improper technic in mixing the toxin and saline. Recently, however, certain diluents have been recommended the purpose of which is to increase the stability of the diluted toxin. Glenny, Pope and Waddington<sup>1</sup> showed that if borate buffered saline is used as diluent in place of the usual phenolized saline there is a marked improvement in the stability of the diluted product. Later Glenny and Waddington<sup>2</sup> found that the stability of the diluted toxin could be further increased by the addition of broth. Bunney<sup>3</sup> recommended as diluent a solution containing 2 per cent peptone, 0.8 per cent sodium chloride and 0.5 per cent phenol. His diluted toxins were entirely satisfactory from the point of view of stability. He pointed out, however, that with his stabilized toxin, reactions were in some cases more marked than was desirable. O'Brien<sup>4</sup> in a recent note stated that Glenny has found that borate buffered saline containing peptone 1-1,000 is a satisfactory diluent for Schick toxin. In a recently published paper<sup>5</sup> we have shown that diphtheria toxin diluted with saline containing borate buffer and gelatin is more stable with respect to toxicity than toxin diluted with saline containing only borate buffer.

In this paper we are reporting further results on the use of borate-gelatin-saline as a stabilizing agent for Schick toxin.

For the standardization and testing of Schick toxin we use the method which is set forth in the "British Therapeutic Substances Regulations," 1927, and also in the Canadian "Regulations under the Food and Drugs Act," 1928. By this method of standardization, Schick toxin must fulfil a toxicity requirement and an antitoxin combining requirement.

\* Read before the Laboratory Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 14, 1931.

The following details, by which a test dose of Schick toxin is measured, are taken from the British Regulations.

1. Toxicity requirement: "By intracutaneous injection into normal guinea pigs, without admixture with antitoxin, 1/50 of 1 test dose must not cause, and 1/25 of 1 test dose must cause, a definite local reaction of the type known as the 'positive Schick reaction.'"

2. Antitoxin combining requirement: "By intracutaneous injection into normal guinea pigs in mixtures with different proportions of diphtheria antitoxin. One test dose mixed with 1/750 or more of a unit of antitoxin must cause no local reaction, but mixed with 1/1,250 or less of a unit of antitoxin must cause a definite local reaction of the type known as the 'positive Schick reaction.'"

Toxins which fulfil these requirements have a toxicity of about 1/50 m.l.d. per 0.1 c.c. From among 10 toxins containing 0.5 per cent phenol which had been stored for 2 years or more, 9 were found by these requirements to be suitable for the Schick test.

#### EFFECT OF VARIATIONS IN DILUENT

In Table I there is summarized the results of experiments on the effect of concentration of borate, concentration of gelatin and pH on the stability of Schick toxin. The toxin solutions used were prepared as follows: Two borate buffer solutions pH 7.9 and pH 8.5, made after the method of Sørensen, were each diluted 1-2 and 1-4 with distilled water and sodium chloride added to a concentration of 0.85 per cent. Four measured amounts of each of these 4 solutions were autoclaved, and after they had cooled, gelatin was added from a sterile 6 per cent solution in amounts to give for each concentration of borate 4 solutions containing respectively 0.08 per cent, 0.04 per cent, 0.02 per cent and 0.0 per cent of gelatin. Diphtheria toxin was then added to each of the 16 solutions in such amount that the final concentration fulfilled the Schick toxin requirements. The Schick toxins, prepared as above, were filled into nonsol vials and some of each of these we kept at 37° C., at room temperature, and in the cold room, until the tests were carried out.

The results recorded in Table I were obtained by diluting the Schick toxins 1/25 and injecting 0.1 c.c. of these dilutions intradermally into guinea pigs. The numbers represent the diameters in mm. of the resulting reactions after 48 hours.

Of the toxins which had been kept at 37° C. for 6 days, those without gelatin were atoxic at the 1/25 dilution, those containing gelatin at pH 8.5 showed a noticeable loss in toxicity, while those containing gelatin at pH 7.9 were not appreciably changed. Further within the limits tested the results showed that the toxicity of the solutions does

TABLE I

EFFECT OF DILUENT AND TEMPERATURE ON SCHICK TOXIN

Temperature	Time	1 to 4 Borate 0.85% NaCl pH 7.60-7.70				1 to 2 Borate 0.85% NaCl pH 7.80-7.95			
		0.08% gel.	0.04% gel.	0.02% gel.	0% gel.	0.08% gel.	0.04% gel.	0.02% gel.	0% gel.
		1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose
37° C.....	6 days	14r	12r	13r	0	11r	11p	11r	0
20° C. (R.T.)	6 mos.	—	12r	12r	—	—	13p	13p	—
7° C.....	6 mos.	—	14r	12r	—	—	12r	12r	—
	10 mos.	15r	15r	14r	—	12r	14r	12r	—

Temperature	Time	1 to 4 Borate 0.85% NaCl pH 8.45				1 to 2 Borate 0.85% NaCl pH 8.47			
		0.08% gel.	0.04% gel.	0.02% gel.	0% gel.	0.08% gel.	0.04% gel.	0.02% gel.	0% gel.
		1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose	1/25 Schick Dose
37° C.....	6 days	0	10p	5p	0	7 v.f.	0	8 v.f.	0
20° C. (R.T.)	6 mos.	—	11p	11p	—	—	15p	12p	—
7° C.....	6 mos.	—	13r	14r	—	—	12r	12r	—
	10 mos.	14r	15r	12r	—	11r	16r	15r	—

v.f. = very faint  
p = pink  
r = red

not depend on the concentration of borate or the concentration of gelatin.

There was no noticeable alteration in those toxins which had been kept for 6 months at room temperature or for 10 months in the cold room (8° C.).

#### STABILITY OF DIFFERENT TOXINS DILUTED TO SCHICK TOXIN CONCENTRATION

Five different phenolized (0.5 per cent) toxins which had been stored for a period of 2 years or more were each diluted to the level of Schick toxin with borate-gelatin-saline (Sørensen's borate buffer pH 8.0 diluted 1-4, sodium chloride 0.85 per cent and gelatin 0.02 per cent). These, after having been filled into glass vials, were left at



37° C. for 4 days and then tested for toxicity. The results, given in Table II, indicate that all 5 toxins were stabilized equally well.

TABLE II  
RELATIVE STABILITY OF DIFFERENT TOXINS AT 37° C. FOR 4 DAYS

Toxin	37°	7°
	1/25 Schick Dose	1/25 Schick Dose
104	11r	14p
147	10p	11p
152	11p	12p
184	13r	13p

r = red  
p = pink

#### EFFECT OF TRANSPORTATION

We owe the suggestion for carrying out an experiment on the effect of transportation on Schick toxin to the paper by Bunney.<sup>3</sup> A Schick toxin, made up as just described, was filled into hard and soft glass ampoules, some of which were sent by mail to various places and returned to us for testing. At no time during the shipping were the ampoules kept on ice. The results given in Table III are for the toxins contained in the soft glass ampoules. There was no significant difference due to the different types of glass.

TABLE III  
INTRADERMAL TOXICITIES AFTER SHIPPING

	1/25	1/5
	Schick Dose	Schick Dose
Icebox Control	12p	18r
China (Chuchow) and return	11p	16r
China (Kongmoon) and return	13p	18r
Spain and return	12p	18r
Nigeria and return	12p	18r
Java and return	11p	18r
Italy and return	12r	17r
Geneva and return	13r	21r

r = red  
p = pink

NOTE: We wish to thank Mrs. Paul Geerling, Dr. W. B. Johnson, Dr. A. Moschini, Dr. Manuel G. Juarequi, Dr. W. B. McClure, Rev. William K. Amyot, Dr. J. G. FitzGerald for their kind coöperation in these experiments.

The toxins were in transport during the summer months—June, July and August. The table shows that they did not lose significantly in toxicity during shipping.

#### REACTIONS IN HUMANS

Table IV gives the results of Schick tests carried out on a group of adults aged 25–35 years. The materials used were Schick toxin

diluted with saline, Schick toxin diluted with borate-saline containing gelatin, Schick toxin diluted with saline and heated, and diluted toxoid. The numbers represent the average diameters in mm. of the reactions 7 days after the injections. There is substantial agreement between the results with the regular Schick toxin and the Schick toxin containing gelatin. The agreements in readings between the 2 toxins were equally good on the preceding days. In no test which we have carried out on humans using regular Schick toxin and Schick toxin containing gelatin has there been evidence of undesirable reaction due to the gelatin.

It is worthy of note that all Schick toxins are not equally suitable for the test. Certain ones give a higher percentage of interpretable readings than others. Of 2 Schick toxins, for example, which fulfil the toxicity and antitoxin combining requirements, one may be more suitable than the other because of the greater degree in which it exhibits a fading out of reaction in immune individuals who are sensitive to diphtheria protein or other protein contained in the Schick toxin.

TABLE IV  
SEVENTH DAY READINGS OF SCHICK TESTS ON ADULTS

No. of Individuals	Antitoxin per c.c. Serum	Stabilized Schick Toxin	Schick Toxin	Heated Schick Toxin	Diluted Toxoid
13	> 1/25	0	0		
1	< 1/100	16p	13p	0	0
1	< 1/100	23r	21r	0	0
1	< 1/100	19r	20r	0	0
1	< 1/100	19r	19r	0	0
1	< 1/100	14r	18r	0	0
1	< 1/100	19r	22r	0	0
1	< 1/100	14p	19r	0	0
1	< 1/100	20r	22r	0	0
1	< 1/100	23r	20r	0	0
1	< 1/100	19r	24r	0	0
1	< 1/100	20r	22r	8p	11p
1	< 1/100	15r	20p	3p	4p
1	< 1/100	16r	20r	11p	10p
1	< 1/100	21p	16r	10p	12p
1	< 1/100	22r	24r	5p	6p
1	> 1/25	9r	20r	12r	22r
1	> 1/25	7p	10p	5p	13p
1	> 1/25	11p	10p	15p	14p
1	> 1/25	16p	18p	14p	9p
1	> 1/25	12p	21p	15p	14p
1	> 1/25	14r	15p	14p	11r
1	> 1/25	16r	17p	16p	16r
1	> 1/25	8p	11p	11p	12p
1	> 1/25	10r	12r	10p	14r
1	> 1/25	5p	10p	10p	10p

## CONCLUSIONS

Evidence is presented that a 1-4 dilution of Sørensen's borate buffer pH 8.0 containing sodium chloride 0.85 per cent and gelatin 0.02 per cent is a suitable diluent for the preparation of Schick toxin.

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Pellagra in the United States

AS early as 1864, Gray of New York, and Tyler of Massachusetts, each reported a case of pellagra. Sherwell of New York reported cases in 1882 and 1902. Harris of Georgia reported a case complicating hookworm disease in 1902. In 1912, Babcock, a pioneer student of pellagra in this country, from a study of the clinical records of the South Carolina State Hospital for the Insane, and from personal interviews and correspondence with practitioners, asylum authorities, and others concerned, reached the conclusion that the disease had been continuously present in South Carolina at least since 1828. He also presented information indicating that the same may be said of many other sections of the South. Searcy, the first to report pellagra in endemic form in this country, states that there had been cases present but unrecognized at the Mount Vernon (Alabama) asylum each year at least since 1901. From a superficial survey of the Peoria (Illinois) State Hospital following the diagnosis of the first case, Siler and Nichols found many cases present, and from their study of this institution they concluded that the disease had been present there without recognition for not less than four years prior to the time of their investigation. Interesting reports of the experiences of practitioners and institution officials with the disease before they knew its nature are frequently encountered in the early American literature on pellagra, and the disease in endemic form has been traced back by various observers in various sections to 1885 and beyond. . . .

The principal argument against the existence of pellagra in the South to any considerable extent prior to its general recognition in 1907-1908 is the fact that it was not so recognized. This position may appear reasonably sound when taken at face value; but there are many valid reasons why the most competent physician might have failed to recognize the disease. Few of the older American textbooks on medical subjects mention it. Such well known books as *Flint's Practice of Medicine*, published in 1866 and revised in 1880, *American Text Book of the Theory and Practice of Medicine* (1887), Musser's *Medical Diagnosis* (1896), and other standard works of that period make no reference to such a condition. In the first seven editions of Osler's *Principles and Practice of Medicine* the disease receives scant notice, the brief reference to it embodying the statement: "it has not been observed in the United States." In a later (eighth) edition of his work this author states that "it has probably been present in the South for 50 years."—*Pub. Health Rep.*, Sept. 18, 1931, pp. 2223 & 2226.

# What Can a Community Do When It Is Not Yet Ready to Establish a Mental Hygiene Clinic?\*

H. G. WEISKOTTEN, M. D.

*Dean, College of Medicine, Syracuse University, Syracuse, N. Y.*

TO ask one interested in medical education to introduce this subject and to ask one interested in nursing education to open the discussion might be interpreted as emphasizing the shortcomings of both medical and nursing education as far as mental hygiene is concerned. Were the medical and nursing profession even reasonably "mental hygiene conscious," the development of a community mental hygiene program would be greatly facilitated.

In view of the previous discussion and the many and varied factors involved, I will present the subject not at all from the theoretical or philosophical viewpoint but rather by reviewing briefly our experiences in Syracuse during the past 6 years. In September, 1925, the situation there was somewhat as follows:

There were no trained workers in family case work. There was no intelligent children's work; no intelligent child placing work. Probation work was very inadequate. Practically no genuine protective work was done. Cases were brought into court and summarily disposed of. No visiting teacher work was done. There were a part-time psychiatrist and a psychologist attached to the Board of Education, whose work, however, pertained to children referred for placement in ungraded classes.

In connection with our Free Dispensary we did have a 5-year old psychiatric clinic, which clinic received both children and adults. During the first 2 years there was neither a social worker nor any clerical help in connection with it. The psychiatrists in charge were busy practitioners serving on a part-time volunteer basis. Handicapped as they were, they were able to accomplish only a little of what we knew should be done and the clinic was failing in the fulness of its purpose

\* Read at a Joint Session of the Child Hygiene and Public Health Nursing Sections of the American Public Health Association at the Sixteenth Annual Meeting at Montreal, Canada, September 14, 1931.

both in the eyes of those responsible for its conduct and of the general profession.

In November, 1922, at the suggestion of the psychiatrist in charge, the state was persuaded to coöperate in placing a competent psychiatric social worker in this clinic, which also served as a state parole clinic. The Onondaga Health Association paid part of the salary of this worker.

By 1925, sufficient interest had been aroused to warrant the formation of the Mental Hygiene Committee in the Onondaga Health Association. Key people in the community were persuaded to accept membership on it.

We had been extremely fortunate in securing an unusually competent worker in our dispensary clinic, and according to plan she immediately became Secretary of our Mental Hygiene Committee. She made frequent reports to the committee and there rapidly developed an enthusiastic interest in her work.

Eventually the committee, desiring to expand the scope of the program, carefully surveyed the entire local situation and decided that the most promising field for development was in the public schools. The City Department of Education signified its willingness to have the Secretary of our Mental Hygiene Committee serve as a visiting teacher in one of the schools. Considerable care was exercised in selecting the school in which this demonstration should be carried on.

The following year she was relieved of her psychiatric clinic responsibilities, this work being carried on by another competent worker brought to Syracuse by the committee.

At the same time the Board of Education appointed an additional psychiatric social worker to do visiting teacher work in another of the public schools. She was selected by the Mental Hygiene Committee and at first her salary was paid by the Milbank Memorial Fund as part of the Syracuse Health Demonstration. After the first year her salary was taken over by the city.

During this whole period, in addition to reporting frequently to the Mental Hygiene Committee, these workers carried on an educational program among the school teachers and with parent-teacher groups.

A number of public meetings, addressed by men with outstanding reputations, were held. The response was gratifying. To develop public interest and understanding, during the fall and winter of 1927 and 1928, a series of 8 mental hygiene lectures was arranged and a fee of \$5 was charged for the course. Our attendance was something over 800 and the lectures netted sufficient funds to provide scholarships for summer courses for 6 local public health nurses and school teachers.

Later we ventured a 4-day institute involving 8 sessions within a period of 2 weeks, conducted by Dr. George K. Pratt of the National Committee on Mental Hygiene. The course tickets sold for \$3 and the average attendance was about 300.

In September, 1929, a psychiatric supervising nurse was appointed in connection with the generalized nursing plan of the Bureau of Nursing of our City Health Department. This, I believe, was an innovation in municipal public health nursing. This supervisor's first activity was to give the nurses an understanding of mental hygiene and methods of approach. The mental hygiene program was integrated with every other activity of the nursing service instead of being developed as a separate entity.

For several years previous the Health Department had employed a part-time psychiatrist in connection with its preschool clinics. Here the psychiatric needs of the cases, including habit training, are met both by private consultation with the mothers and in habit training classes. The mental hygiene aspect of the preschool work has become very popular, so much so in fact that it is difficult to meet the demand for this type of service.

Other agencies were stimulated by the development of our program, and in April, 1929, following a study of the local situation by Dr. C. C. Carstens, the Children's Bureau (formerly The Society for the Prevention of Cruelty to Children), was completely reorganized. A competent director and trained social case workers were brought to Syracuse and that agency is now rendering a real, high type service.

In September, 1930, 2 additional visiting teachers were appointed by the Board of Education, which is now apparently prepared to develop this work as rapidly as practicable.

During this whole period there has gradually developed throughout the community a real demand for trained social case workers with a knowledge of mental hygiene. The Community Chest and the city administration have within the past few months sponsored a study of the entire local situation by the Family Welfare Association of America. We are looking forward to a series of really worthwhile developments as a result of this study.

Early in the development of our program there was evidenced an interest on the part of several groups in the establishment of a high grade child guidance clinic in Syracuse. A special committee of the Mental Hygiene Committee was appointed to consider the matter. The state was building a psychopathic hospital as one of the units of the University Medical Center and there was much discussion in regard to the advisability of this institution, or one of the other units of

the center, assuming responsibility for such a clinic. There was also much uncertainty in regard to how far the development of the Department of Education mental hygiene program would extend. These uncertainties with the relatively great financial outlay involved in the establishment and maintenance of such a clinic have led us to defer action in regard to it. There were also those of us who were still uncertain as to whether child guidance work should be developed by psychiatrists or by psychiatrically trained pediatricians.

With the opening of the State Psychopathic Hospital in January, 1931, the psychiatric clinic was transferred from the dispensary to the new institution. Although children have been admitted to both the out-patient department and the hospital proper no effort has been made to develop a child guidance clinic.

During the past year the school psychiatrist has been placed on a half-time basis and maintains regular hours for conference and consultation with visiting teachers and for the study of problem cases.

Although we clearly see our need for high grade child guidance facilities, our future development will depend upon finances and personnel available. As I suggested earlier, there is much uncertainty in the minds of many of us in regard to the most wholesome development in this whole field. It is entirely possible that, because of the extent of the field and the relatively great expense involved in what we now consider an ideal program, an entirely new approach may be sought.

The development of a mental hygiene viewpoint on the part of the medical and nursing professions will surely permit a much more co-ordinated program than is now possible. I believe that both medical and nursing educators are awakening to their responsibilities in this direction.

Although I have necessarily omitted many details, I hope that I have given you some idea as to what has seemed to us the soundest type of development of a mental hygiene program under the conditions existing in Syracuse.

#### RECOMMENDATIONS

On the basis of this experience, I would be inclined to leave with you the following suggestions:

The development of a mental hygiene program should be placed in the hands of an agency which assumes community leadership and has very definite community force.

This agency may operate within its own field or by coöperation within the field of some other agency either official or unofficial. It can best operate in that field which has great need for development and at the same time offers a setting which promises most easily demonstrable results.

The scope of the work undertaken must be sufficiently limited to guarantee that it will be well done.

No demonstration work should be undertaken except by adequately trained workers. However, this does not mean that all of the adequately trained personnel required for a complete program must be available from the start. A real demand for these may be developed only as the program progresses.

Have frequent reports made by the workers to the agency members. In this way you will develop an interested forceful nucleus.

Carry on a steady educational program as the various groups in the community are ready for it.

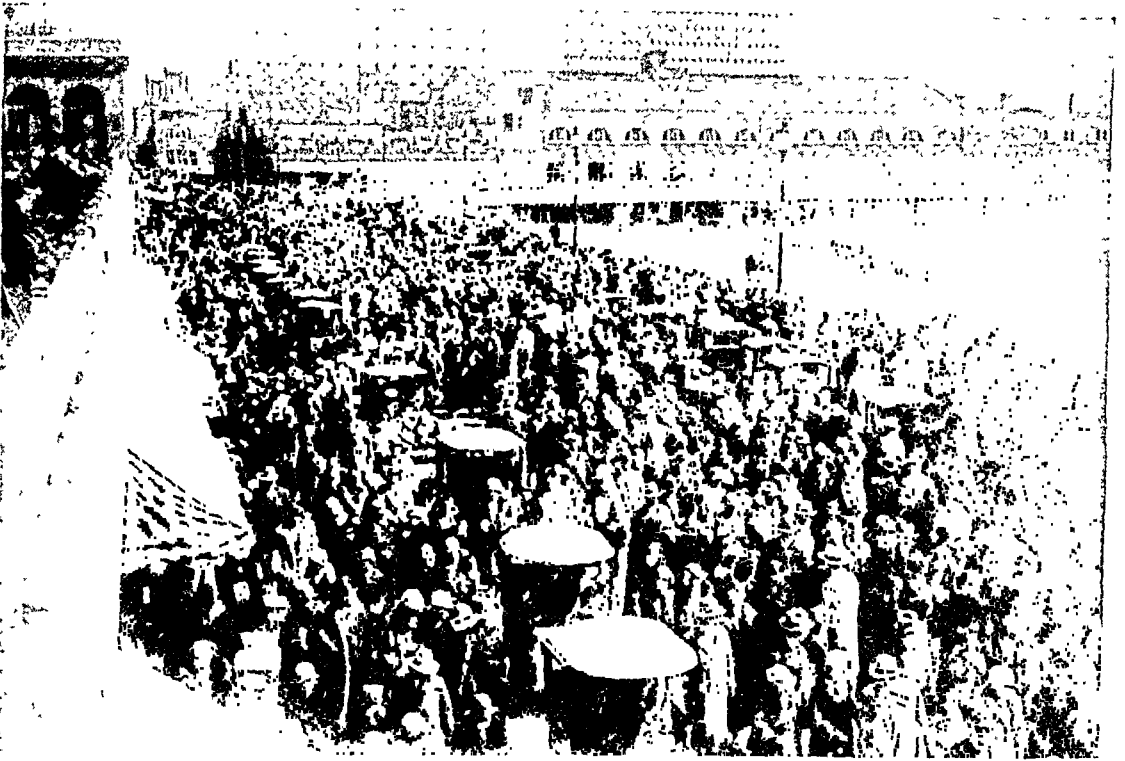
Gradually extend the scope of the work, being sure not to lower standards by too rapid expansion or bringing in or tolerating incompetent workers.

Make every effort to carry along the other agencies in the development.

I believe that much of the preliminary program can be carried on even in the absence of an adequately trained psychiatrist. The development of the program will usually create a demand for such an individual.

Just as the development of our child health program created a demand for an increased number of pediatricians throughout the country, so the development of our mental hygiene program will create a like demand for adequately trained personnel. Once established, this demand will just as surely be met.





## Marketing Mass Education\*

HOMER N. CALVER, F. A. P. H. A., AND BERTRAND BROWN

*Assistant Professor of Hygiene, Bellevue and University Medical College, New York University; and Director of the Division of Publication of the Milbank Memorial Fund, New York, N. Y.*

MANY discussions pertaining to health education lead early in their course to confusion of thought because the phase of the subject discussed is not made clear at the outset. To avoid this difficulty the Public Health Education Section of the American Public Health Association several years ago, proposed a terminology for common use. Phraseology was then recommended to define three types of public health educational activity:

1. The formal academic instruction given to students of health was designated as "public health training." (Two different types of training are actually embraced under the terminology "public health training." On the one hand it includes the curricular courses designed for those who are studying to equip themselves as public health workers of one type or another, i.e., public health nurses, engineers, epi-

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\* Read before the Public Health Education Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 16, 1931.

demiologists, etc.; and on the other hand, it includes the incidental training in hygiene or public health given to those who may later become auxiliary aids in the public health campaign, for example, teachers, social workers, and physicians.)

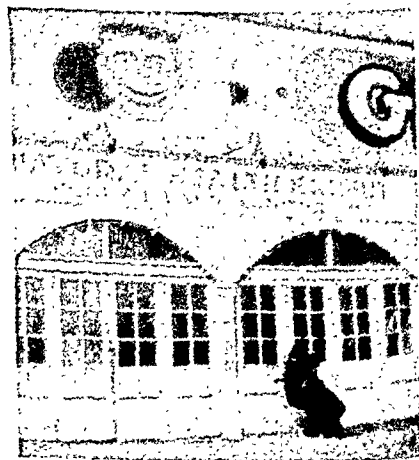
2. The training of children in the school and elsewhere in health habits and the principles of hygiene and public health was designated as "child health education," and this term has become well established.

3. The less formal activities directed to the education of the adult population were designated "popular health instruction," phraseology which has not been widely accepted. The implication here that you cannot educate the mass but only instruct it suggests defeat at the outset.

The subject of this paper cuts somewhat across all three of these distinctive lines of endeavor. In the main, however, it concerns adult health education and child health education outside the classroom. Because neither of the fields indicated, singly or together, serve to emphasize the extent of the problem here in mind (its scope and the methods it necessitates being far beyond those commonly visualized) we have borrowed from contemporary popular educators in China the term "mass education."

By "mass education in health," is meant the dissemination among the whole population of knowledge gained by the technical worker in the field and laboratory to the end that this knowledge may be applied individually and collectively for the prevention of disease, the postponement of death, and the building up of a vigorously healthy population.

Failure to discriminate between the terms "hygiene" and "public health" also results in confusion at times. The one concerns the indi-



*Coney Island crowds are eager for health information and not discriminating as to its source.*

vidual and his personal acts. The other concerns the individual only as a unit of society and his part in the collective acts of the group. Mass health education is concerned with both hygiene and public health and needs to distinguish between them in formulating its programs.

It is not necessary perhaps here to dwell on the importance of public health education. But there have been times in these counsels when the importance of adult education has been allowed to become obscured by emphasis on child health education. Adult education has been considered, when at all, chiefly as instruction in personal hygiene temporarily necessary to correct earlier deficiencies in child health education. Some would have us believe that if we could only thoroughly train one generation of children the necessity for adult health education would thereupon cease. The child is father to the man but the man is also father to the child. And this relationship has significant implications for health educators. In a diphtheria immunization campaign or in such instances as the recent epidemic of infantile paralysis, prevention depends on adult understanding. In many instances, adult education provides society with its only opportunity for reaching the child.

Our whole program of child education is dependent upon a certain amount of adult education, at the very least an amount sufficient to approve appropriations for teachers' salaries. Much educational effort with children is nullified by adult example. Indeed it is often nullified by the example of the teacher herself. It is doubtful if such nullification would be eliminated by offering adequate health education in their youth to future adults, parents and teachers.

How much of the content of one's early training is really carried into adult life? If the principles of health taught in childhood are to maintain their brilliant reality through all the amazing experiences and expanded horizons of adult life, the education of the individual must be everlastingly kept at, through grade school, high school, college, and mature adult life. What Bruce Barton says of advertising is equally true here: "You can't advertise today and quit tomorrow. You are not talking to a mass meeting—you're talking to a parade."

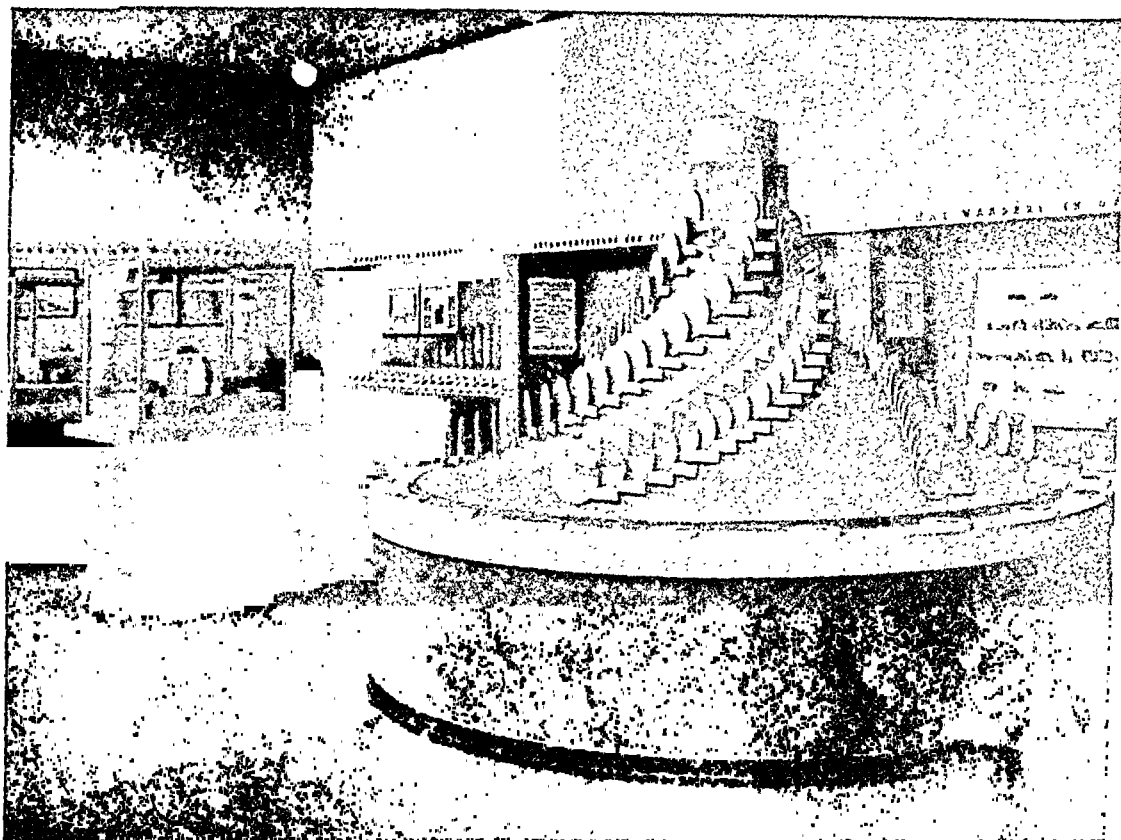
Even though we accept the importance of continuous mass education we have but rude implements with which to perform our tasks. We pour our time and money into posters, pamphlets, lectures, motion pictures and the radio, but we do not know very much about the relative educational value of these technics. Who can say in what circumstance a radio talk is more effective and economical than a motion pic-



*Spacious corridors, colorful designs and artistic presentation of information on hygiene attract many visitors*



*The traveling health museum is independent and self-contained. It carries an exhibition tent on its roof and facilities for displaying a complete hygiene exhibit including motion pictures.*



*Carefully planned dynamic exhibits invite study and compel attention.*



*Permanent displays of three dimensional models at the German Hygiene Museum provide an open textbook on hygiene.*

ture or when a poster will get better results than a pamphlet? Our measurement of the effectiveness of printed matter has too often been in terms of good printing, not in terms of life saving. This is as if the serologist strove for a serum which was crystal clear rather than for one which produced immunity. We cannot assume that because good printing pleases us it will please the public, or that if pleasing it will result in action. It may be that poor printing would save more lives than good printing.

Who can prove that his established use of any cherished medium has value in terms of life saving? What have we to show that the general health of a group exposed to prolonged health educational ministrations is any better off therefor? In our scant attempts to prove the value of our technics, we have been content with subjective standards.

Largely because they have proceeded empirically, health educators are tolerated as step children in the family of public health scientists. The laboratory man and the health officer have shown that toxin-anti-toxin prevents diphtheria. The engineer has reliable statistical evidence that protection of a water supply decreases the incidence of typhoid fever. The public health nurse, the statistician, and the epidemiologist can produce convincing proof of the life saving value of their efforts. If mass education in health is to assume its legitimate place as a valuable routine in the public health campaign, equal in rank to vital statistics, bacteriology, or administration, the value of its methods must be proved, and newer and more effective methods found. It may be no more difficult to establish scientifically the value of our educational technics than it was to establish the value of present-day routines of communicable disease control. Those routines now appear to have been so easily proved, only because they have *been* proved.

The stern discipline of the laboratory and the brilliance of its results have attracted millions of dollars for research. As a result we have, compared with the past, a tremendous store of knowledge in preventive medicine. This is a store in the warehouse sense in that for the most part this knowledge is stored away in textbooks and journals, hidden from the layman among incomprehensible words and symbols and disguised with appalling statistics. Yet the research worker has performed his task. He has found the knowledge he sought. We have failed to make this knowledge available for the service of mankind. Production of knowledge has far outstripped consumption.

It is frequently argued that mass education in health cannot be

effected because the public is not interested in health. This argument is fallacious. It is an alibi undoubtedly often used when salesmen first tried to introduce the "horseless carriage." But the science of public health is not in the "horseless carriage" stage. There is abundant evidence of a ready market for health. Last March we visited the boardwalk at Coney Island. In spite of bristling weather, we found crowds gathered to listen to so-called health lectures by modern medicine men. These spell-binders are known as pitchmen. They sell books, rubber exercisers, psylla seeds, ointments, tonics and whatnot. They appreciate the dollar and cents value of the health appeal and the visual method. They constitute a clearly defined group on the edge of the entertainment profession. The health appeal has been seized upon also by producers and distributors of all types of articles in selling their wares. Automobiles, soap, refrigerators, underwear, toys, books and, of course, all sorts of foods are urged upon us for their health value. That the health motif has such universal commercial importance would indicate sufficient popular interest to insure success in any mass movement in health education, if the proper technics were used.

Hope for the future lies in our emergence from the empirical stage. With the help of our scientific confreres, we must test by objective standards our long established practices. But while undergoing such self-analysis, and perchance resultant housecleaning, we cannot profitably sit idly watching the parade go by. The problem of mass health education here outlined calls for the inauguration of methods adequate to the new concept which has already been caught by commercial interests.

That mass education, conceived in the broadest possible terms, is necessary to secure the utilization by individuals and communities of available demonstrated health knowledge, which, applied, would lengthen life and make it happier, this group does not need to be persuaded. Any methods, new or old, which will help to raise the health intelligence of the masses, this group will welcome. Proponents of visual methods of health instruction believe that wider use in America of the museum method, its value in other fields long since well established, will be a means of reaching thousands of individuals who are now indifferent to other appeals.

The museum of hygiene has demonstrated its success in Germany and elsewhere. As a museum it is not merely a repository of historical objects and data but a true educational institution. It is fundamentally a permanent exhibition of devices cleverly arranged to command interest and crystallize understanding. Such an institution

would draw its elements from many sources. It would be equipped with workshops, research laboratories, lecture rooms, a library, broadcasting studio and auditorium, in addition to spacious exhibition halls. It would serve as a center for research, experimentation and demonstration in visual and other unexplored methods for disseminating health knowledge.

There is probably no better existing model for such an institution than the Deutsches Hygiene Museum in Dresden. A museum like that in Dresden, adapted to American needs and medical standards, would be an important adjunct in spreading health knowledge among the masses, as well as in offering health education in elementary and secondary schools. It would also be a valuable aid in teaching hygiene in schools of medicine. For industry, as well, such visual instruction as only a museum could provide would be of inestimable benefit in instructing workers in accident prevention and health preservation.

A suitable building for such a museum would have ample proportions, easy accessibility, and possibilities for future enlargement. Among the exhibits would be wax, glass, and plaster models, charts, and posters. They would visualize all health problems related to the more common diseases in a manner so graphic and dramatic as to command the attention of the average layman and be readily understood by him. They would provide instruction on the structure and functions of the various parts of the body. They would illustrate such subjects as biology, personal hygiene, mental hygiene, care of the teeth, nutrition, prenatal, postnatal, and child care, communicable disease control, tuberculosis, venereal diseases, tropical diseases, hygiene of work and the protection of the worker.

The Deutsches Hygiene Museum began its existence in 1911 in connection with the first International Hygiene Exhibition. In 1930, the opening of a new and spacious permanent building for the Museum served as an occasion for holding in Dresden the second International Hygiene Exhibition, an event which was repeated in the summer of 1931. The permanent exhibits which this new building houses are the last word in visual health instruction. The charts, specimens, models and apparatus used are striking in design and compelling in interest.

A unique feature of many of the displays is their movability, that is, many models are so arranged that the museum visitor may operate them by turning a crank, pushing a lever or touching a button. This not only excites curiosity but compels attention and probably assures that the lesson of these particular displays at least will be remembered.

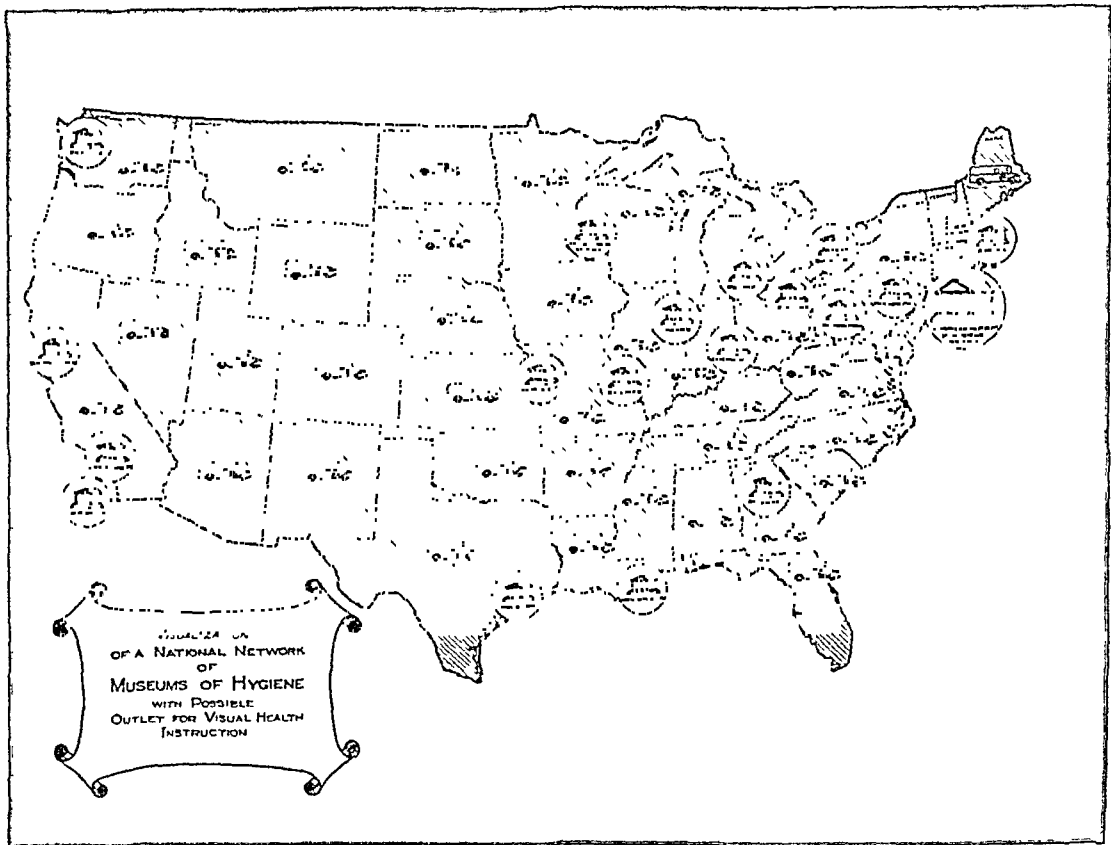


These devices are most valuable also in attracting visitors to the museum.

A determined and highly successful effort has been made to keep all descriptive texts in the simplest language. The deadly seriousness which so often marks the effort to portray scientific information is absent to a large extent. Indeed many of the charts and legends are quite droll, and this effect has been achieved without sacrifice of professional standards.

The German museum probably goes further than public health workers in America would find it judicious to go in its emphasis on physiology and personal hygiene at the expense of community hygiene. It has, however, successfully maintained a balance between the various special hygies. Such an exhibit gives to the man in the street a means of separating the true from the false and differentiating between the important and the trivial in the health propaganda to which he is subjected today from a variety of special interests.

Such a museum established in a large city in America might well become the headquarters for an extensive educational program comprising both intramural and extramural activities. Among the intra-



*The concept of a national network of museums serving to disseminate health knowledge among the masses is inspiring to contemplate.*

mural activities there would be lectures based on exhibits; radio broadcasts as dramatic in their way as the exhibits themselves; specially prepared exhibits on subjects of timely interest, such as influenza and infantile paralysis; and regular courses in hygiene and health education in coöperation with local schools and universities.

If the full value of the museum were to be realized, however, its activities could not be confined to its own building, or its home community. It would, for example, develop small portable loan exhibits for which there is an ever-present demand. Official and voluntary public health agencies have now neither the funds nor adequate experience in exhibit technic to provide sufficient valuable material of this type. Traveling exhibits such as the motorized exhibits of the German museum might well be utilized. In coöperation with state health departments, a number of which are already utilizing traveling exhibits, this would provide an admirable method of reaching rural populations. In time these temporary exhibitions might stimulate the development of a number of permanent museums, locally financed.

The question of financing such developments is one that we do not propose to raise here. Support has been forthcoming in the past for worthwhile projects. And if professional health educators in America earnestly desire such institutes for health education, and adequately voice that desire, undoubtedly support for them may be had in the not too distant future.

If we are to reach the masses, we must enlarge our view of the size of the job that confronts us. We cannot leave off with any temporary popularization of a few simple ideas. The task must be institutionalized. All phases of the health education movement must be utilized in concerted effort. New and effectual methods must be devised and continuously utilized in educating the whole mass of the population, generation upon generation, as to the importance of achieving, and the methods for achieving that summit of racial well-being which the searches of pioneers have made distantly visible. It is believed that museums of hygiene would serve as permanent centers for research and experimentation in health educational method and as a continual inspiration to reference sources for health educators. The concept of a national network of such institutions, serving in concert as a far flung, permanent and living force for the dissemination of health knowledge among the masses, is noble in purpose and inspiring to contemplate.

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# Health Aims and Professional Services Infancy, Preschool and School Ages<sup>\*</sup>

## Medium City

W. W. BAUER, M. D., F. A. P. H. A.

*Commissioner of Health, Racine, Wis.*

THE health of the child has been recognized as the most favorable point of attack in initiating a community health program. Scientifically, this choice is sound because we all recognize that not much is to be expected of efforts directed toward the health of generations which have reached adult life, while, on the other hand, the child is plastic. Moreover, if we are successful with the child of today, we have accomplished something for the adult of tomorrow and may reasonably expect that when our failing hands relinquish their activity we may find others who can carry on as well as we have—or better.

In attacking the question of child health in a medium sized city, we must first consider what the needs of the community are. What is its infant mortality? What are the component elements of the infant mortality—are the infant deaths occurring in the first few days of life, in the first month, or during the last 11 months of the first year? What are the leading causes of infant deaths? prematurity, diarrheal diseases, or respiratory diseases? What is already being done in the community with respect to the health of its children? Is there a safe water supply? Is pasteurized milk from tuberculin tested cattle available? Is the board or department of health functioning in child health work? If not, have there arisen voluntary groups to meet the need? If there are already workers in the field are they working toward the proper objectives as shown by the needs, or are they merely going through a routine copied from other communities? These, it seems to me, are questions which must be answered satisfactorily before we can proceed to discuss what the child health service of a given organization shall be.

It has always been fairly easy to establish child health programs in a community because of the sympathy for children, and especially for

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<sup>\*</sup> Read at a Round Table of the Child Hygiene Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 15, 1931.

babies, which is so easily aroused by appeals to the emotions. Unfortunately, while the response is usually generous it is not always wise. Too often it takes a form which at the outset seriously handicaps future progress of the work. Altogether too frequently child health programs, initiated either by voluntary or official organizations, fail to take the medical profession into their confidence and thus antagonize the physicians in the beginning. It is a much more difficult and time consuming task to overcome an established antipathy than it would have been to proceed from the beginning without creating needless antagonism.

The first question that is put before us is whether the public health aims and services of infancy, preschool and school health programs should provide medical and nursing service for sick children or for well children only. I wish to answer that question categorically in the negative as far as sick children are concerned. In my judgment, the community has a very definite responsibility for the dissemination of health information, and I believe that the demonstration method is the only one which will ever produce worthwhile results.

For well children there should be free facilities provided by the community, which should by actual demonstration teach the mother the proper care and handling of a new baby. This means clinics for physical examinations plus nursing service with demonstrations of bathing, formula preparation, clothing the baby, and advice as to exercise, sleep, sunshine, fresh air and routine of life. Such a service should be free to all, regardless of their economic status, because we know that it is not alone the poor and the unfortunate who are lacking in health information concerning their children.

On the other hand, the sick child is placed by the very fact of its illness outside the pale of preventive medicine. I recognize that there are border-line cases in which doubt may well arise as to classification, but most of these belong in the hands of the family physician or of the medical service provided by the community for the indigent sick. In my judgment, this latter should be definitely differentiated from the preventive service offered by the community.

I am definitely opposed to state medicine. I believe, and I think an overwhelming majority of the medical profession of this country believe with me, that the relationship between the doctor and the patient is a delicate, highly personal one which cannot and ought never to be standardized. When the community steps between the patient and the doctor, and the doctor becomes a paid servant of the state, both patient and doctor lose that indefinable relationship which has set the practice of medicine on a plane apart from all the other learned

professions. Therefore, for the community to provide medical service for the sick, unless they be indigent, is certain to lower the quality of medical service which the patients will receive.

We have but to look about us to see how difficult it is to get the more able and successful of our citizens to enter public life. They know from observation that a public servant is the target for unjust, frequently unreasonable, sometimes libelous, and almost always destructive, criticism. It is only the man with an extraordinarily placid disposition, or whose enthusiasm for the cause enables him to brush aside the irritations of public life, who can long survive in public office. If this is true of non-professional men, how much more forcefully does it apply to the doctor!

The doctor has always been an individualist, and I hope and trust that he will always remain so, though perhaps with a somewhat improved capacity for coöperation. The greatest leaders and teachers in medicine have repeatedly admonished their students that it is the patient who must be treated and not the case. If the community provides medical service for the sick, it must do so upon a mass basis; otherwise the cost becomes prohibitive. Preventive measures may be applied collectively, but sick people cannot be treated *en masse*; they demand, and are entitled to receive individual consideration.

Therefore for the infant, the preschool child, and the school child—and may I add the expectant mother—we may and should, through the community, provide health information and preventive service, but we must not mix our preventive program with community relief lest we unwittingly destroy both. Public health nursing has long held this as a basic tenet in its code of ethics.

The second question placed before us is whether the service for well children should be limited to education of parents, or is it the responsibility of the community to provide advisory medical service to safeguard the health of the children? It seems to me that our objective should be the education of parents and that our service should be limited to that objective. By education of parents I do not mean that we shall confine ourselves to the everyday educational weapons now commonly employed by health departments, such as pamphlets, indoor and outdoor posters, radio talks, group addresses, classes for mothers and little mothers, and exhibits. These means should be employed but there should also be education by demonstration. That means clinics at which well babies should be examined and at which the mothers can have demonstrated to them the condition and health of their babies; and that preschool children and school children should have physical examinations provided by the community.

I think, on the other hand, we have too often followed the line of least resistance. I recall very well the establishment of a child health center in a certain community. It was established by a voluntary agency, though the same error which I am about to elucidate might just as well have been committed by an official agency. In short, there was a section of this city populated largely by people of good education and economic status somewhat above the average. Many of them were college graduates; all had at least a high school education; and all were intelligent and progressive. They organized, and requested the establishment of a child health center in their neighborhood.

When the health officer was consulted, he pointed out to the committee that with funds available for only one more center, it was better to open it in a locality where the need was greatest. He was met with the argument that in the location he suggested there was no demand for the service. He attempted to point out that the very existence of a demand where they proposed to establish the station was evidence that the need for education in child health was less in that locality than in the other where no demand existed.

He made a spot map for them of infant deaths over a 5-year period and showed them that it was decidedly clean where they proposed to establish health service for babies and very markedly spotted in the other locality. He was overruled and has since on a number of occasions been shown the remarkable records of attendance at the baby clinic which was established in response to this vocal demand.

This instance seems to furnish the answer to a number of questions which I asked in opening this paper. Obviously much more good could have been done by opening a baby clinic in the center of a locality populated largely by laboring people of foreign descent and tackling the hard and much less attractive problem of awakening these people to a need which they did not even suspect.

I am a firm believer in the clinic method of objective demonstrations, and I think it should be open to all to teach the mothers what they ought to know about the health of their children. Nevertheless a mother who has 6 or 7 babies perhaps in as many years should not be encouraged to bring them, one after another, to a child health clinic, unless she is of low mentality, and is unable to learn from experience. I think that when her first baby has had the advantages of advisory service, she should not be allowed to shift her responsibility to the community as subsequent babies arrive, except perhaps to bring a new baby once or twice to refresh her mind. Should there not be graduation from health education as well as from other kinds? Should the

mother not be expected to learn, after a reasonable time, to go to her family doctor for well baby supervision? I am assuming that the family is able to pay for supervisory health service. If unable to pay, then of course the community owes it to her and to her baby to give her service indefinitely.

Let me not be misunderstood when I refer to the launching of public health projects without the coöperation of the medical profession. I am not making any plea for toleration of reactionary physicians who obstruct all progress and who oppose public health projects because of the mistaken idea that the economic effect upon the medical profession will be bad. We know that in the larger view, educational activities in the public health field, even when they render a considerable measure of advisory service, react to the benefit of the physicians. I believe that the more farsighted of the medical profession fully agree in this opinion. What I do want to emphasize is that public health is and must be based on the medical sciences. It is true that public health objectives are strongly tinged with social and economic aspects, but basically they are medical. It seems but logical that the medical profession should have a large measure of consideration in their inception and development, not for the sake of the medical profession, but for the benefit of the public health.

I am perfectly aware that organized medicine has not always assumed the leadership in the field of public health which might logically be expected of it, though it was doctors who first demanded health departments in many communities. It is, no doubt, partly the fault of the medical profession that the situation exists as it does, and yet we in the public health field are by no means blameless. Too often we evolve a full blown and—to us, at least—very beautiful project and seek the endorsement of the medical profession without ever having consulted them during the process of development and preliminary discussion. Being but human, they are resentful and we sacrifice coöperation which ought to be ours, and without which we can ill afford to proceed.

When the medical profession has been given due opportunity to participate and coöperate in public health work and has declined, rejected, or attempted so to hamper the work with restrictions that it becomes meaningless and futile, then obviously there is nothing to do but proceed to meet the community need, regretting the lack of participation by organized medicine.

Finally, in supporting my opinion that public health work should be limited to education and demonstration and should not attempt to supplant the family physician, I wish to cite the growing tendency in

this country toward paternalism in government. This tendency has been attacked often enough of late, and yet it proceeds apace. There is a growing feeling on the part of our citizens that they can and should thrust all their responsibility upon their government. A man buys a dog for a pet; the dog becomes mad; his owner calls upon the city to come and get the dog and either care for him or destroy him. Why should the community relieve him of a responsibility which he created? A small child playing alone on the street is the victim of an accident and the neighbors and friends proceed to condemn the community government because there was not a policeman on that spot at that moment to prevent the tragedy. Where were the parents? and why was not this child better guarded by them? An economic depression unbalances the wheels of industrial progress and a clamor arises for government to wave a magic wand and right matters overnight. Cannot business and industry stand on their own feet? Such examples could be multiplied without end.

Our nation was built upon individual initiative; today there is grave danger that in taking away from the individual too much of his responsibility we are going to destroy his resourcefulness, his self-reliance and his independence.

For those reasons which I have here imperfectly outlined to you, I believe that public health projects in the infant, preschool and school fields—and in others not here under discussion—should have education for their objective more and more, and service less and less.

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### Premiums to Mothers, Liège, Belgium

TO overcome the indifference of women to prenatal work and to infant health work, the municipal council of Liège, on July 1, 1931, offered premiums of 200 francs each to expectant mothers who attended regularly a prenatal health center or were examined by their own physician at least once before the end of the 6th month of pregnancy and not less than 3 times during the entire pregnancy, and who have had their infants regularly examined either at a health center or by the family physician. The premium is paid 3 months after the birth of the child.—*Oeuvre Nationale de l'Enfance, Revue Mensuelle*, Brussels, July, 1931, p. 776.



## Public Health Service Hospitals Now Maintained at 155 Ports

**A**PPROXIMATELY 500,000 persons apply yearly for care, treatment and physical examination at hospitals and other relief stations which the U. S. Public Health Service maintains at 155 ports of this country and its possessions.

Practically every class of disease is found among these patients. In the care and treatment of them, valuable scientific knowledge constantly is gained.

In the 25 marine hospitals operated by the Service more than 300 doctors and dentists, over 400 nurses, aides, and dietitians, and approximately 1,800 other persons are constantly employed in the care of a daily average of about 4,000 patients. The annual expenditures in the marine hospitals and other relief stations are more than \$5,000,000. The marine hospitals are all general medical and surgical hospitals except the hospital at Carville, La. (National Home for Lepers), which is devoted to lepers, and the hospital at Fort Stanton, N. Mex., to which are transferred merchant seamen and other beneficiaries with tuberculosis, suitable for treatment in a high altitude.

The Marine Hospital at Ellis Island, while primarily designed for detained immigrants, is also used for regular service beneficiaries, and all the marine hospitals admit patients of the Veterans' Bureau when facilities permit. New marine hospitals have recently been completed at Detroit and Cleveland, others are in process of construction at San Francisco (500 beds), Galveston, and New Orleans (600 beds), and new marine hospitals have been authorized in New York (600 beds), Baltimore, and Seattle. The building program is necessary to keep pace with the development of the American merchant marine and to fulfil other obligations of the government to provide hospital treatment.

Those who now are entitled to the medical care and treatment from the Service are as follows:

1. American seamen employed on board in the care, preservation, or navigation of any registered, enrolled, or licensed vessel of the United States.
2. Officers and enlisted men of the Coast Guard.
3. Officers and seamen on vessels of the Coast and Geodetic Survey.
4. Officers and crews of vessels and certain keepers and assistant keepers of the Lighthouse Service.
5. Officers and crews of vessels of the Bureau of Fisheries.
6. Immigrants detained at immigration stations.
7. Seamen from vessels of the Army Engineer Corps and other vessels belonging to the United States Army.
8. Seamen employed on vessels of the Mississippi River Commission.
9. Beneficiaries of the United States Employees' Compensation Commission.
10. Patients of the Veterans' Bureau.
11. Lepers.
12. Officers of the Public Health Service and employes on field duty.
13. Prisoners at United States penal and correctional institutions.
14. Patients at Federal Narcotic Farms.

## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

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## REGISTRATION FEES AT ANNUAL MEETINGS

FOR the first time in the history of the American Public Health Association, the registration fee plan was established at the Sixtieth Annual Meeting in Montreal. Previously, it had been the custom to levy a tax of \$1.00 upon non-members of the Association registering at the annual meeting. This year, members and non-members alike were asked to pay a fee of \$2.00 when they registered. This innovation caused some discussion and a few protests. The Committee on Meetings and Publications, upon whose recommendation the plan was approved by the Executive Board, has been requested to explain to the membership why the recommendation was made and why the practice will be continued at the Washington meeting in 1932.

Like many organizations, the American Public Health Association has had difficulty in financing its annual conventions. Until the Committee on Meetings and Publications assumed the responsibility for the conduct and management of meetings, the annual meeting was expected to be a source of revenue for the Association. Not only was the city entertaining the Association called upon to provide entertainment for the visiting delegates, but it was also expected to raise sufficient funds to turn in to the Association treasury a considerable balance after all local expenses had been met. The success of an Annual Meeting came to be measured largely by its financial return, and the

meeting went to the highest bidder. This system placed an undue burden upon the health workers in the convention city. Money-raising became a bug-bear, and many communities that desired the meeting naturally showed hesitation in issuing invitations because of the financial responsibility involved.

The committee faced this situation frankly and determined to change it. It was decided that in future no financial guarantee from any city will be required. The expenses of the executive office will be financed as far as possible from the sale of exhibit space. The local committee in the convention city will be asked to provide entertainment only, and that entertainment may be as simple or as elaborate as the local committee determines.

The term "entertainment," as used here, must not be interpreted as meaning social and good-time functions exclusively. Included in "local entertainment" are those things that can be supplied without considerable expense by any community with an organized convention bureau. We refer to registration and information personnel, registration equipment, stenographic service, etc. Included also is transportation of delegates by the most convenient and economical means to places of public health significance in and around the convention city. The providing of music for dancing, the printing of a directory of points of scientific interest, and other small practical items that contribute to the success of a convention are included further under the general heading "entertainment."

Since the financial responsibilities of a city entertaining the American Public Health Association have been so materially lessened, the number of annual invitations has greatly increased. No community finds the demands unreasonable. The expenses of the executive office are still to be met, however. Program building, which requires the calling together of some 25 section and committee representatives two or more times a year, is expensive. Program printing is expensive. The membership must be kept informed of annual meeting plans by mail. A publicity appropriation is an essential. An annual meeting city cannot be selected solely because a large amount of exhibit space can be sold there. Occasionally a city is chosen that makes little or no appeal to the commercial exhibitor. Then the income from the sale of exhibit space drops, but the expense of the meeting remains fairly stationary.

It is to provide a margin of safety for the executive office that the registration fee plan has been adopted. It should be borne clearly in mind that no salaries and no overhead are included when annual meeting expenses incurred by the executive office are calculated. Only

those expenses are considered that would not be incurred if no annual meeting were held.

The protest has been recorded that the registration fee penalizes the member who attends the annual sessions. It is true that he makes a nominal contribution to its costs, which the member staying at home should not be expected to pay. However, he is provided, through co-operative action, with much more than he could possibly buy by spending the same amount himself. The Committee on Meetings and Publications believes or estimates that the average delegate spends between \$100 and \$200 in attending a convention; hence an additional \$2.00 paid as a registration fee is not a great factor in his expenses, while the total of registration fees may make the difference between a balanced income and expense statement on behalf of the annual meeting and a considerable deficit.

The committee further justifies its recommendation for the registration fee plan by calling attention to the fact that more than 50 per cent of the organizations of the country have adopted it, according to the International Association of Convention Bureaus, and "in virtually no case has the plan ever been abandoned once it was adopted." The range of fees charged is considerable, \$2.00 being the minimum, and running up to \$10.00 for some groups.

The Committee on Meetings and Publications feels that \$2.00 for everyone attending the meeting is a fair charge. Under existing circumstances it would not recommend a larger fee, and it anticipates the day when annual meetings can be adequately financed through other methods. In the meantime, it considers prevailing practice a safe guide.

### THE ANTI-INFECTIVE ACTION OF VITAMIN A

MUCH has been written concerning the vitamins, their necessity in nutrition, and in fitting the body to resist infection. In 1929, Edward Mellanby and his coworkers reported favorable results in the treatment of puerperal septicemia with preparations containing vitamin A, which led them to the conclusion that the demonstration of curative effects argued that this vitamin would have a much greater prophylactic power. Experiments on young animals with vitamin A and with carotene led them to believe that these agents were "anti-infective" in their action. They have since carried out an extensive series of experiments on pregnant women. During pregnancy the mother not only has to keep her own body well nourished, but must supply all substances necessary for the development of the fetus; she

must store vitamin A in her liver, as well as supply it or its precursor, probably carotene, to the liver of the fetus. An examination of fetal livers by one of the authors has shown that the majority of them contain vitamin A in varying quantities.

For the experiment 550 women attending the outpatient department of the antenatal clinics of Sheffield were selected, all of whom were subsequently delivered in a hospital. Those who did not enter a hospital for delivery were not included in the results. Radiostoleum, a preparation containing the sources of vitamins A and D dissolved in a neutral oil, was given to the women, preferably a month before delivery, though in some cases for 2 weeks only. Without selection, alternate women were given a supply of this material with instructions for its use. There were 275 women who received the vitamin preparation, while 275 acted as controls. The number of primiparae and also those who required manual or instrumental intervention was almost equal. Other complicating factors were almost equally distributed in the 2 groups. In the group taking the radiostoleum, judged by the B. M. A. standard, there was an incidence of morbidity of only 3 cases, or 1.09 per cent, while in the control group there were 13 cases, or 4.73 per cent. At the Jessop Hospital, the morbidity rate was 5.8 per cent as compared with the average rate of 3 years for that hospital—6.8 per cent. The group receiving vitamin had a morbidity rate of 1 per cent, while the control group had 5.8 per cent. Another point of interest brought out was the fact that the total number of pyrexial cases among the women taking vitamin was 56, or 20.4 per cent, while in the control group it was 98, or 35.6 per cent, a difference of 15.2 per cent, which the authors point out is practically 4 times the standard error, and therefore significant. Among the vitamin group, only 4 women had pyrexia which lasted from 1 to 3 weeks, while there were 10 of this character in the control.

The authors believe that these results are significant, showing an increased resistance to infection on the part of the treated women, with a decrease in the clinical severity and duration of the infection when it did occur. They also concluded, on experimental evidence, that vitamin D had little to do with the results, though they do not entirely exclude it as a factor, since the normal calcium metabolism requires some source of vitamin D.

The authors of this paper are well known as careful students and experimenters. If their results are confirmed they will prove a boon in childbirth. America stands low in the list of nations in regard to maternal mortality, and any preventive measures which offer such help would seem to deserve careful investigation.

The so-called anti-infective power of vitamin A has received a good deal of attention for some years past. It has been used in hearings on filled milk before committees of Congress, the argument being that cream and butter fat aided in the prevention of tuberculosis.

Professor Mellanby and his wife, who is well known for her work on the relation of vitamins to the development of teeth, have for some 5 years taken cod liver oil daily, and during that time have been practically free from ordinary colds, which they attribute to the vitamin A. Needless to say, this is not a controlled experiment, though interesting, especially when taken in connection with the observations on puerperal women.

#### REFERENCE

1. *Brit. M. J.*, Oct. 3, 1931, p. 595.

## LETTERS FROM GREAT BRITAIN

AT the suggestion of Dr. Charles Porter, the Editor of *Public Health*, the official organ of the Society of Medical Officers of Health, an exchange of letters has been agreed upon between him and the Editor of this JOURNAL, who will be assisted by the Associate Editors of the JOURNAL in the collection of matters of interest. We are sure that Dr. Porter's letters will be of general interest to our readers, and we hope that the American letters will also appeal to the readers of *Public Health*. On our part, it can only be said that we look to England as the place of origin of modern public health. The work of Chadwick began the movement in that country, which soon spread to the United States through the foresight of

Shattuck. England now has a Minister of Health in the Cabinet, with Sir George Newman as the Chief Medical Officer. The Medical Research Council of England has for a number of years put out much of the very best public health literature, based on careful studies, that we have.

As Editor of *Public Health*, Dr. Porter has direct access to the best sources of information in England. Personally, no man in that country is better fitted to select and write of health matters than he. His large experience in medical matters coupled with his legal knowledge, for he is a barrister at law as well as a physician, enables him to discuss health work from every angle.

### FROM A CORRESPONDENT IN GREAT BRITAIN

#### THE NEW "NATIONAL" MINISTER OF HEALTH

The tumult and the shouting of what, in the journalistic phrase, is the most remarkable election of modern times having died, there remains to be seen what is to be the effect on health works in Great Britain of the various economies announced as necessary. In this connection, it may be noted that more or less of a promise was given that the activities to be least and last interfered with would be those affecting the public health. In any case, it is unlikely that anything dramatic or drastic will be attempted at first or even eventually. In selecting the Minister of Health in his administration, Mr. MacDonald, it is suggested in some quarters, was thinking more of his Cabinet than of the Department; Sir Edward Hilton Young being of the type and possessing the ability required at

the present juncture, and being comparatively unheard of in relation to public health matters. As a matter of fact, statements of this kind are not uncommonly made apropos health ministers in England. The fact that the individuals appointed rarely hold the position for long, but pass on to what are regarded as higher cabinet posts, supports the view, frequently expressed, that it is something of a stepping-stone, and that particular knowledge of, or a special flair for, the work is unnecessary since the permanent officials are capable of doing all that is required. That there is a good deal of exaggeration in these statements in the case of Sir Edward Hilton Young may be taken, since, having occupied the position of Crown representative on the General Medical Council, it may be accepted that he has acquired some knowledge of preventive medicine that will prove useful at the

Ministry and beneficial to the public health at large.

#### THE UNEMPLOYED AND WATER WORKS SCHEMES

The possibility that the public health may require benefiting is one not to be overlooked. Considerable optimism exists in some quarters on account of the fact that the numbers of unemployed have fallen. Against this must be set, however, that the unemployment pay (the so-called dole) has been reduced, as have also wages in the bulk of the trades. Nutrition as a result is certain to suffer, and with it the health of the people. The public assistance bodies throughout the country anticipate that heavy claims will be made upon them during the winter. Local authorities also, desirous as they are to economize, are certain to find the provision made for supplying nourishment to expectant and nursing mothers and to babies, on the recommendation of medical officers of welfare centers will be heavily taxed. Among works put in hand with the object of assisting the unemployed it is interesting to note that several schemes for providing or improving water supplies are included. The city of Manchester, for example, has in hand an additional scheme estimated to cost £1,500,000 and the Durham County Water Board is engaged in the provision of a new reservoir costing about £1,000,000. Sanction to borrow up to £3,116,000 for expenditure on similar purposes was granted during the past year by the Ministry of Health. In this connection it is noted in the report of the Ministry that there is an increasing tendency toward more comprehensive schemes instead of a multiplication of small schemes, and that the larger local authorities, seeking new or additional sources, are inclined to arrange matters so that they may supply others who happen to be in the neighborhood of their aqueducts. This is all to the

good, since, though the improvements in the supplies of the smaller areas, rural particularly, are most encouraging, there remains much to be done before conditions in these can be regarded as generally satisfactory. As a result of the operation of the Local Government Act, it is hoped that more active progress in this direction may be made.

#### LOCAL GOVERNMENT ACT AND FULL-TIME HEALTH OFFICERS

This is not the only line that progress may follow in the case of rural districts as a result of the operation of the Act mentioned. One in particular is in respect of the services of a health officer, and in this the Ministry report directs attention to a requirement of the Act that every county council after consultation with district councils shall formulate arrangements, by combination of districts or otherwise, for securing that every medical officer of health subsequently appointed for a district shall be restricted by the terms of his appointment from engaging in private practice as a medical practitioner.

For the guidance of county councils, the Ministry of Health has issued a memorandum setting out a number of methods by which the services may be secured of medical officers of health devoting the whole of their time to public duties, and describing various forms of combined appointments for consideration, e.g., medical officer of health and school medical officer, medical officer of health and tuberculosis officer, etc.

During the year, 42 health officer appointments approved were of the whole-time class, this being about half the total number of approvals granted by the Minister.

In the Society of Medical Officers of Health a considerable number of the members hold part-time appointments only, or are assistant medical officers carrying out specialist duties in relation to schools, tuberculosis, maternity



and child welfare, venereal diseases, etc. At the last meeting of the Society, one of the most important items on the agenda was the election of the President and other officers for the ensuing year. As President, Dr. Killick Millard, Medical Officer of Health of Leicester, was chosen; Dr. George F. Buchan and Dr. Charles Porter—both of whom are Honorary Fellows of the A. P. H. A.—being selected, the former to act as Honorary

Treasurer, and the latter as Honorary Editor of *Public Health*, the official organ of the Society. The President contributed an interesting and thoughtful address on "Voluntary Euthanasia" in which he put in a plea that its practice, with proper safeguards, should be legalized, and submitted draft of a law which he considered would cover the points of importance.

CHARLES PORTER, M.D.

## LETTERS OF APPRECIATION

AT the Montreal meeting six Honorary Fellows were elected from England. These were Sir Arthur News-holme, Sir George Newman, Sir W. Leslie MacKenzie, James Fenton, M.D., Charles Porter, M.D., and Sir Allan Powell. Of these the last three were present at the meeting, and, together with George F. Buchan, M.D., presented a symposium on Public Health Administration in Great Britain.

The following appreciative letters have been received from The Royal Sanitary Institute and The Society of Medical Officers of Health:

Dr. Kendall Emerson, Secretary,  
American Public Health Association,  
New York City.

Dear Dr. Emerson,

The Council of the Society of Medical Officers of Health have directed me to tender you their sincere thanks for your kindness and hospitality to the Society's delegates who recently returned from a memorable journey in the United States and Canada. These gentlemen have reported in the warmest terms on the welcome they received, not only at the Congress of the American Public Health Association which was the main purpose of their visit but at every point of their journey.

This Society was from the first anxious to take the opportunity of sending a delegation to the Montreal Congress, but it is especially gratifying to feel that in these difficult times the links between preventive medicine on opposite shores of the Atlantic have been strengthened and our mutual understanding still further augmented.

With again many thanks for your part in making our representatives welcome,

I am, Sir,

Yours very truly,

(Signed) G. L. C. Elliston

Executive Secretary

The Society of Medical Officers of Health

1, Upper Montague Street,  
Russell Square,  
London, W. C. 1,  
2d November, 1931.

Dr. Kendall Emerson, Executive Secretary,  
American Public Health Association,  
New York, N. Y.

Dear Sir,

The Members of the Royal Sanitary Institute delegation to the United States of America and Canada (Dr. Charles Porter, Dr. George F. Buchan and Dr. James Fenton) have reported to the Council on their visit, and the many interesting things which they saw, and the valuable information they have obtained.

The Council feel that great benefit must accrue from this interchange of thought and ideas between officers engaged in the service of the public health, and they desire me to express to you their sincere thanks for the kindness and hospitality which you so kindly extended to the Members of the Institute's delegation, as a result of which their visit was made so pleasant, as well as instructive.

Yours faithfully,

(Signed) J. W. Dudley Robinson

Secretary

The Royal Sanitary Institute

90, Buckingham Palace Road,  
London, S. W. 1,  
26th October, 1931.

# ASSOCIATION NEWS

*Sixty-first Annual Meeting of the A. P. H. A.  
Washington, D. C., October 24-27, 1932  
Headquarters, Willard Hotel*

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A. P. H. A. by the Sub-committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

### *Health Officers Section*

Archie Cole, 318 Rose Bldg., Pampa, Tex.,  
City Health Officer  
Jaynes M. Crumb, M.D., South Otselic, N.  
Y., Health Officer  
Emil O. Ficke, M.D., Dept. of Health, Daven-  
port, Ia., Director of Public Health

### *Laboratory Section*

M. Dorothy Beck, Berkeley, Calif., 1636 Jose-  
phine St., Bacteriologist  
Rhoda W. Benham, Ph.D., 630 W. 168th St.,  
New York, N. Y., Mycologist, Vanderbilt  
Clinic  
K. H. Clough, 2015 Franklin Ave., Houston,  
Tex. (Assoc.)  
Dr. Alfredo Iglesias, Constitucion 13, Vera  
Cruz, Mex., Jefe de la Unidad Sanitaria Co-  
operativa de este Puerto  
Seymour C. Schwartz, M.D., Baltimore, Md.,  
4006 Bateman Ave., Student, formerly with  
U. S. Army Medical Corps

### *Vital Statistics Section*

Abraham S. Pactovis, Health Dept., Quincy,  
Mass., Statistical Clerk

### *Public Health Engineering Section*

Benjamin V. Howe, State Bd. of Health,  
Denver, Colo., State Sanitary Engineer  
James M. Jarrett, LaFayette, Ga., Box 56,  
Sanitary Engineer, State Board of Health  
Ernest H. Salmon, North Battleford, Sask.,  
741 Main St., Supt. of Water Supply

### *Food and Nutrition Section*

Paul J. Zentav, M.D., 322 Beaumont Bldg.,  
St. Louis, Mo., Secretary, St. Louis Pure  
Milk Comm.

### *Child Hygiene Section*

R. Grant Barry, M.D., Wood School, Academy  
St., Trenton, N. J., Medical Director, Tren-  
ton Public Schools  
Carl C. Dauer, M.D., 434 N. High St., Salem,  
Ore., Director, Child Hygiene, Marion  
County Health Dept.

Horace M. Fooder, M.D., 110 Black Horse  
Pike, Williamstown, N. J., Medical In-  
spector, Monroe Township Public Schools  
Frederick K. Lam, M.D., Bureau of Mater-  
nity, Infancy, and Child Hygiene, Board of  
Health, Honolulu, Hawaii, Director  
Russel H. Williams, M.D., Box W, Granville,  
O., University Medical Officer

### *Public Health Education Section*

Carl L. Anderson, Ann Arbor, Mich., 108 W.  
Williams, Student, formerly Teacher in  
Health Education  
Edward L. Bernays, 1 Wall Street, New York,  
N. Y., Counsel on Public Relations  
Ethel M. Hanson, 2525 Euclid Ave., Cleve-  
land, O., Head, Health Education Dept.,  
Cleveland College  
George H. Hoxie, M.D., Kansas City, Mo.,  
1000 Rialto Bldg., Medical Director, Kansas  
City Tuberculosis Society  
Fred C. Mills, Boy Scouts of America, 2 Park  
Ave., New York, N. Y., Director of Swim-  
ming and Water Safety  
Izetta North, 1337 N. University Ave., Ann  
Arbor, Mich. (Assoc.)  
Armin A. Roth, 966 Washtenaw, Ypsilanti,  
Mich., Student, formerly Instructor in  
Health Education  
Alma L. Wingeier, 1507 Wells St., Ann Arbor,  
Mich., Student, formerly Instructor in Phys-  
ical Education

### *Public Health Nursing Section*

Helen C. Manzer, R.N., 10 Sheridan Sq., New  
York, N. Y., Executive Officer, Comm. on  
Health, New York Principals Assn.  
Mary Murphy, R.N., 1638 E. Wheeling Ave.,  
Cambridge, O., Metropolitan Life Ins. Nurse  
Maxine E. Owens, R.N., Fayetteville, W. Va.,  
Public Health Nurse, Fayette County  
Elizabeth I. Rood, R.N., 440 E. 26th St., New  
York, N. Y., Head Nurseship, operating  
room, Bellevue Hospital  
Mrs. W. J. Ross, R.N., 10 Orchard St., Wades-  
boro, N. C. (Assoc.)

# PUBLIC HEALTH ADMINISTRATION

**The Objectives in Public Health Nursing**—The National Organization for Public Health Nursing has issued a tentative statement outlining the range of public health nursing services and its various aspects. It is hoped that this may serve as a measuring stick for the appraisal of individual nursing service. Health officers have long sought a means of measuring the objectives of nursing service and of appraising their own departmental work.

The general objectives of all public health nursing services are:

1. To assist in educating individuals and families to protect their own health
2. To assist in the adjustment of family and social conditions that affect health
3. To assist in correlating all health and social programs for the welfare of the family and community
4. To assist in educating the community to develop adequate public health facilities

The objectives of public health nursing in relation to the various phases of the community health program have been enumerated for each of 12 functional divisions including: (1) Maternity, (2) Infancy, (3) Preschool, (4) School Age, (5) Adult Health, (6) Morbidity, (7) Communicable Disease, (8) Tuberculosis, (9) Venereal Disease, (10) Mental Hygiene, (11) Orthopedic, (12) Industrial Nursing Service.

(Ed.—Detailed objectives are here given for but one of these services.)

The objectives of the maternity nursing service are:

1. To get in touch with all prospective mothers as early in pregnancy as possible
2. To see that they are provided with both medical and nursing supervision throughout the maternity cycle
3. To instruct mother and father in maternal hygiene\* and infant care.

4. To instruct in the preparation for delivery

5. To arrange or provide nursing assistance during delivery

6. To provide or supervise adequate nursing care to mother and to new-born baby

7. To secure physical examination of new-born baby

8. To secure medical examination for the mother

Objectives in Public Health Nursing, *Pub. Health Nurs.*, 23, 9: 439 (Sept.), 1931.

\* Throughout these Objectives, "hygiene" implies the whole meaning of the term, e.g., physical and mental hygiene.

**Rural Health Organization**—In June, 1930, there was held at Geneva, under the auspices of the League of Nations Health Committee, a Conference on Rural Health Organization in Europe. The committee considered (1) guiding principles and suitable methods for insuring effective medical assistance in rural districts; (2) the most effective methods of organizing the health services in rural districts; (3) the sanitation of rural districts: the most effective and economical methods.

The findings and recommendations of the Conference were set down in a number of resolutions describing guiding principles and statements of fact. The Conference believed that 2,000 is the maximum number of persons who can be given proper medical attention by a duly qualified medical practitioner. In Germany it has been found that there is one physician to 2,317 persons in rural districts while in cities the proportion is 1 physician to 786 persons.

There should be available for the rural population, centers for diagnosis and specific treatment, suitably equipped and provided with a qualified staff.

There should be facilities for hospitalization and it is recommended that there should be a hospital for a population of from 20,000 to 30,000 people with about 2 beds per 1,000 of population and a minimum of 50 beds for any one hospital. There should also be provision for laboratory services and the utilization of medical specialists.

With regard to public health services, there are two principal forms of rural health organization: the form in which the state administers the local services, and the form in which the state has only supervisory functions, the local authorities being responsible for the local health administration. The optimum size of a rural health district would vary with the density of population and local disease conditions but in general should be from 20,000 to 100,000 with an average of 50,000 population. The minimum staff for such a rural health district should consist, in addition to the health officer, of 1 or more public health nurses, a sanitary inspector, and a clerk. The sanitary inspector should receive suitable training at an institute of hygiene. The services of a sanitary engineer should be made available either by the local official or by the central health organization.

It is not deemed possible to recommend a model budget for a rural health district. Funds may be derived in varying proportions from the state or from the local district. Collaboration with the medical profession and private health agencies is strongly urged.

(This publication can be obtained through the World Peace Foundation, 40 Mt. Vernon St., Boston, Mass.)

European Conference on Rural Hygiene, League of Nations, 1931.

Montreal, Canada—One of the features of the Montreal Health Department report of 1930 is an account of mental hygiene work in the Catholic schools. The work has not been started

in the Protestant School Commission, but an agreement has been concluded between the Department of Health and this Commission to begin the work after the holidays in 1931. The staff consists of 3 psychiatrists and 3 psychologist nurses.

The program consists in giving special examinations to detect abnormal children, to place them in auxiliary classes where special pedagogical and technical training will be given. If the number is large enough, it is stated that special schools should be organized in addition to the special classes. It is anticipated that a special institution, like the one in the district of Quebec, should be provided for children needing this type of care. The committee on mental hygiene has received the support of school authorities in this undertaking.

During the year, 9,069 children received 3 immunizing doses at intervals of 3 weeks of anatoxine Ramon, and 5,060 were given subsequent Schick tests within 4 to 6 months. In addition to immunization work done by the department of health in its baby clinics and among school children, the child welfare association immunizes in the 13 baby clinics under its management. The "Federation d'Hygiene Infantile" carries on this work in its 18-baby clinics, as does the "Ecole d'Hygiene Sociale Appliquée." The City of Montreal supplies the anatoxine and Schick test material provided the organizations follow the methods of the department of health and report all cases immunized.

Shorewood, Wis.—Shorewood, with a population in 1930 of 13,500, reports that 2,844 pupils, or 91 per cent of the school children of the community, received health examinations during the year and that of this group 28 per cent were found to have "correctible defects." Of those children having defects, 65 per cent received treatment. In one school, 1 per cent of the chil-

dren were found to have cardiac defects of an organic nature and were referred to the family for their doctor's opinion. The functional heart cases, 52 in number (1.9 per cent), are kept under observation and restricted from competitive games unless the family physician advises otherwise. They are reexamined at 6-month intervals, or oftener when indicated.

The policy regarding health examinations is to examine all athletes for competitive sports at the beginning of each school year, to recheck all known heart cases, to examine the new students entering schools, and give a routine heart examination to all pupils.

As the examination of pupils in a schoolroom is completed, a typewritten report of the findings is sent to the teacher in order that children with sight or hearing defects may be given special consideration in seating, and to secure coöperation and interest in obtaining corrections and an intelligent understanding of the handicapped children. The family, by note, telephone, or home call, is notified of any defects found.

It has been the practice for a nurse or physician to visit each school every morning and afternoon for the purpose of inspecting absentees and to exclude from school any children with symptoms of illness. Temperature is taken of each child inspected. No treatment is given in school except first aid in emergencies.—Annual report of the health commissioner, Shorewood, Wis., 1930–1931.

**Pasadena, Calif.**—The annual report of the Pasadena Health Department for the fiscal year ending June 30, 1931, is built around the *Appraisal Form for City Health Work*, and shows a rating of 817 out of a possible 1,000 points for the health work of the city. On the basis of a population of 76,210, the expenditures of the health department amount to \$.80 per capita, while

expenditures of other agencies for health total \$1.76, including dispensary and preventorium service. In the Inter-Chamber Health Conservation Contest, Pasadena received honorable mention.

This city operates under the city manager plan, and the health officer is appointed by the city manager for an indefinite term, on a full-time basis. Upon the request of the health officer an advisory committee on public health was organized, consisting of 3 physicians, appointed by the Medical Society, plus a representative each from the Woman's Civic League, the Visiting Nurse Association, the superintendent of the hospital, and the Community Chest.

The city has been divided into districts and the nurses and sanitary inspectors under their respective chiefs are responsible for these districts. The only exception to this policy is in meat and milk inspection. "Nurses and inspectors are impressed with the fact that their work is educational as well as supervisory."

**Los Angeles County Health Department, Calif.**—According to the annual report of the Los Angeles County Health Department for the year ended June 30, 1931, marked improvement has been made in the general management of the department. The creation of the position of business manager and necessary office assistance to set up proper bookkeeping, accounting records and statistics, as recommended in the health survey report of 1928,\* have enabled marked economies to be effected. The budget is broken up by function, and by district, and an adequate control system through proper internal forms and requisitions is maintained. Monthly balance sheets are now available to the

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\* This survey was made for the Los Angeles County Bureau of Efficiency at the suggestion of the County Health Officer by Ira V. Hiscock and Harry F. Scoville, under the auspices of the Committee on Administrative Practice of the American Public Health Association.

executive as well as detailed reports on expected liabilities.

The total expenditures in 1930 amounted to \$1,218,064, or 4.1 per cent less than in 1929; yet the amount of floor space increased 31 per cent, the medical work in clinics 33 per cent, and communicable disease cases handled 45 per cent over the previous year. The health department served an area with a population of 705,000 in 1930 at a gross per capita cost of \$1.72. The contract system of service with cities necessitates a daily time-sheet showing distribution of all work by location as well as character. Each city is given a detailed cost report annually. This work is done through the Hollerith system of punching cards from the daily service data, the sorting and tabulating being done by electrical machines. Segregation of costs by function is also thus secured economically. Special unit cost studies are also being made.

A committee was created during the year to bring together the demands of the field and health center services with the central office administration. This committee, known as the standardization committee, considers all new forms of procedures requested or inaugurated in the department. It also attempts to standardize supplies and equipment with the aim in view of eliminating excessive waste. This mimeographed report of 207 pages contains much interesting administrative information, attractive cuts and architect's floor plans of the health centers, and many statistical charts and graphs which relate to finances as well as to vital statistics.

**Anderson County, S. C.**—The ninth annual report of the Anderson County Health Unit for the period ending September 30, 1930, contains among other interesting features an account of a pellagra clinic held at the health unit offices where examination of patients and complete histories were made and diets

were outlined. One hundred and fifty-eight patients with pellagra received instruction during the year. Pellagra is considered one of the serious public health problems of the area.

**Akron, O.**—A portable milk testing truck, built by the Dairy and Food Division of the Department of Health, was put into use the first of the year 1930. The farmers' milk is tested on this truck for sediment and keeping qualities at the pasteurizing plant before it is unloaded, and that which is below standard and condemned is not mixed with the other milk in the plant. This procedure has aided both the farmers and the consumers. One plant reported that in previous years, during hot seasons, they often returned, because of souring, as many as 200 to 250 cans of milk a day, while in 1930, during a similar period, they returned but 10 cans.

During the year the eradication of tuberculosis among cattle of the county and territory supplying Akron was completed and the county became "accredited." Over 98 per cent of the milk supplied to the city is also pasteurized. —*Annual Report, Dept. of Health, Akron, 1930.*

**Kanawha County Health Unit, W. Va.**—Through the educational system, the county health unit has been able to interest the Parent-Teacher Associations and Women's Clubs in participation in the public health program in a constructive manner. They have been the means of bringing together large numbers of parents and their children in various places throughout the county for health conferences, where members of the health unit meet for the purpose of teaching prenatal care, furnishing instruction to promote infant, preschool and school hygiene, giving instruction regarding communicable disease control, and providing artificial

immunization against typhoid, diphtheria, and smallpox. "We believe these conferences have had a most enduring effect and an educational value on account of the practical demonstrations."

There were 84 conferences held in schoolhouses during the school term and also during vacations, with an attendance of 13,000. Complete immunizations against typhoid fever numbered 7,201, against diphtheria 4,098, and against smallpox 4,538. The larger and more populated communities are said to have been previously immunized and hence the numbers protected in 1930 were smaller than for the previous year.—*Fifth Annual Report*, Kanawha County Health Unit, W. Va., fiscal year ending June 30, 1931.

**Hygienic Institute, Illinois**—The activities of a full-time district health program for La Salle, Peru, and Oglesby, Ill., made possible through an endowment plan, are described in detail in the 16th annual report of the Hygienic Institute. The population served approximates 28,000 and the budget for the last fiscal year was \$39,000. Besides the income from endowment, each of the cities contributes to the budget. Other sources of revenue are the Tri-City Tuberculosis Society, Metropolitan Life Insurance Company, State Department of Public Health, fees from bedside nursing, and the handling of vital records. Through identical city ordinances, the executive head of the institute, known as director, has always been

selected as health commissioner of each city. Each city also has a board of health, which consists of the commissioner of public health and safety, the chief of police, and the health commissioner.

The personnel of the Institute, besides the Director, consists of a bacteriologist, a sanitary officer, a chief nurse, and 6 staff nurses, a stenographer-clerk, a general service man, and 5 clinicians. The institute maintains a medical library for the use of the physicians of the three cities, and partially supports a hospital for the isolation of communicable diseases. "Modern public health discoveries and practice have so greatly reduced the need for such hospitals in the smaller cities that but 3 patients applied for admission during the past year. These consisted of 1 case of erysipelas, and 2 cases of scarlet fever."

An arrangement has been worked out with the Tri-City Medical Society, whereby the physicians vaccinate the school children for a small consideration, and the Institute has inaugurated pre-school clinics, at which toxoid for the prevention of diphtheria is given. In 1929 and 1930, the city of La Salle received honorable mention in its population class, in the Inter-Chamber Health Conservation Contest of the U. S. Chamber of Commerce.

This interesting report of 67 pages is well illustrated with photographs and statistical charts and tables, and is worthy of study by public health administrators.

# LABORATORY

## ACCURACY OF COUNTING AN AGAR PLATE \*

DR. F. L. SCHACHT AND DR. A. H. ROBERTSON

*New York State Department of Agriculture and Markets, Albany, N. Y.*

UNLESS the agar plate is counted accurately, the bacterial analysis is worthless. Each analyst must answer the question when counting a plate, "Shall I count this colony or not?" *Standard Methods of Milk Analysis* states that all recognizable colonies shall be counted.

During 1930 four counting contests were conducted. Thirty-five individuals counted one or more plates. One or more of 17 different combinations of counting equipment were used. A total of 38 plates were counted and 1,543 duplicate counts recorded. At each contest a system was usually followed in

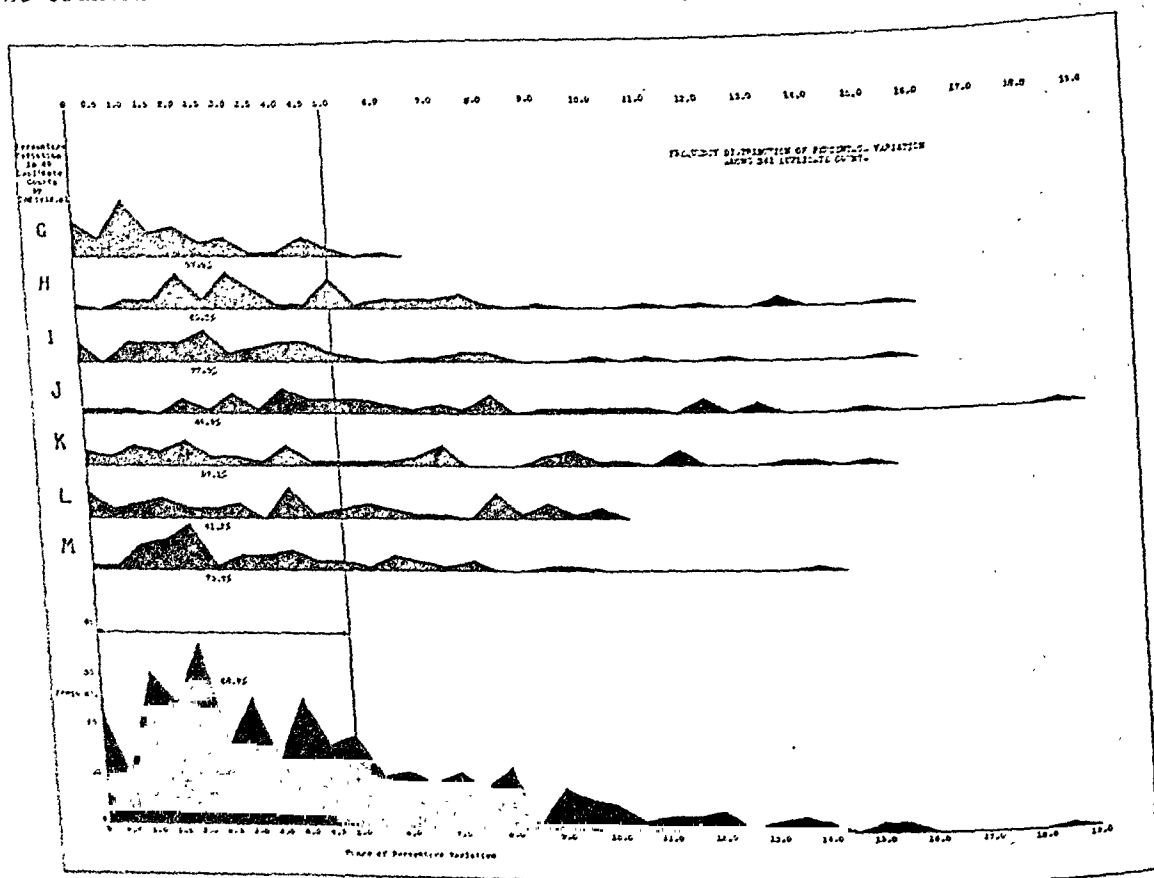


FIGURE I—FREQUENCY POLYGON OF PERCENTAGE VARIATIONS BETWEEN DUPLICATE COUNTS AMONG THE 7 ANALYSTS AT THE SYRACUSE PLATE-COUNTING CONTEST. EACH ANALYST COUNTED 49 PLATES IN DUPLICATE.

\* This article was prepared by the authors, from the Annual Report of the New York State Department of Agriculture and Markets, 1930—Editor.

which 6 people counted 6 plates in duplicate, using 6 different counting devices, making a total of 72 counts on



TABLE I  
OBSERVED VARIATIONS AMONG COUNTS ON THE SAME PLATE

PLATE NUMBER	Mean count	Number of individuals in contest	Number of devices in contest	Percentage variation be- tween highest and lowest mean count calculated on the means among *		Single counts obtained †	
				Individuals	Devices	Highest	Lowest
ALBANY CONTEST							
				<i>Per cent</i>	<i>Per cent</i>		
1.....	319	6	6	21	9	374	240
2.....	217	6	6	49	10	319	170
3.....	231	6	6	6	18	286	190
4.....	287	6	6	9	7	344	234
5.....	60	6	6	21	16	74	50
6.....	116	6	6	16	24	144	93
SYRACUSE CONTEST							
7.....	115	7	7	12	7	137	96
8.....	50	7	7	40	17	93	39
9.....	124	7	7	23	10	211	96
10.....	275	7	7	30	14	346	134
11.....	200	7	7	18	12	281	141
12.....	68	7	7	24	25	148	53
13.....	102	7	7	23	10	120	80
MIDDLETOWN CONTEST, FIRST GROUP							
14.....	157	6	6	15	170	283	84
15.....	134	6	6	32	38	197	89
16.....	126	6	6	35	44	292	101
17.....	171	6	6	43	27	269	125
18.....	45	6	6	22	19	61	31
19.....	86	6	6	16	23	130	65
MIDDLETOWN CONTEST, SECOND GROUP							
20.....	65	6	6	68	30	127	22
21.....	114	6	6	21	18	165	92
22.....	24	6	6	22	23	35	20
23.....	58	6	6	18	9	70	51
24.....	287	6	6	18	23	354	218
BINGHAMTON CONTEST, FIRST GROUP							
25.....	80	6	7	16	11	95	60
26.....	62	6	7	15	13	80	50
27.....	75	6	7	12	15	88	59
28.....	188	6	7	11	6	214	170
29.....	151	6	7	16	11	196	118
30.....	162	6	7	2	11	179	138
31.....	82	6	7	24	27	133	47
BINGHAMTON CONTEST, SECOND GROUP							
32.....	87	6	7	47	35	138	60
33.....	168	6	7	68	42	231	80
34.....	54	6	7	74	43	86	24
35.....	66	6	7	49	24	110	33
36.....	46	6	7	66	81	107	26
37.....	105	6	7	37	26	160	64
38.....	56	6	7	46	35	84	33

\* The number of counts averaged depends on the number of individuals and the number of counting devices as given in columns 3 and 4. The individual mean count is calculated regardless of device used and the device mean count is calculated regardless of individual who counted.

† These excessive variations in this column may be explained in some cases by the lack of familiarity of the worker with the counting device and in others by an unsatisfactory apparatus. The results secured on the same apparatus, particularly if a satisfactory one, are much more consistent.

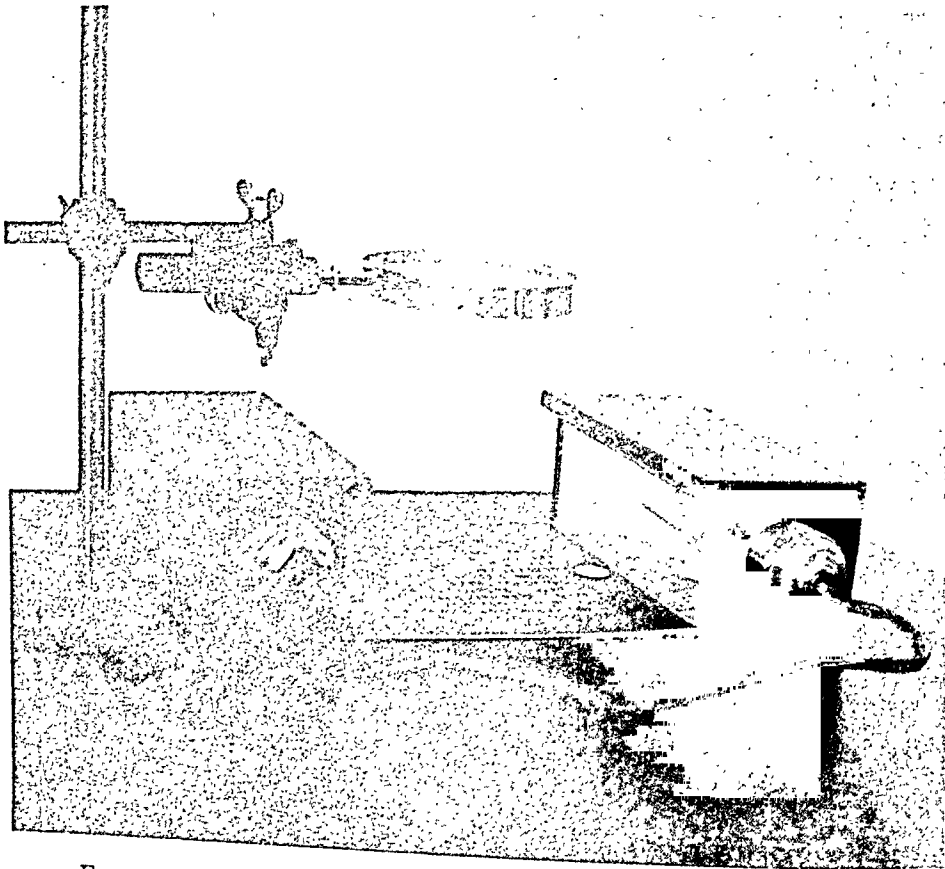


FIGURE II—A SATISFACTORY HOME-MADE PLATE-COUNTING DEVICE

each plate. A slight modification of this plan prevailed in some cases. From this information the individuals as well as the devices which gave consistently the highest and lowest counts were determined. The ability of the individuals to duplicate their counts was measured also.

The variations between individuals' counts on the same plate regardless of device used are summarized in the fifth column of Table I. The next column summarizes these variations from the standpoint of the device used regardless of the individual who counted. It is very difficult to draw sharp lines defining the variability attributable to the individual or to the device. Our opinion that the personal equation offers the greatest source of error is founded on the observation that only on 6 of the 38 plates were the percentage differences among individual's means less than 15 per cent, and 37 per cent of

them were greater than 30 per cent. In contrast to this, 37 per cent of the percentage differences among device's means were less than 15 per cent and only on 9 of the 38 plates were the percentage differences greater than 30 per cent. Furthermore, a comparison of the percentage variations reveals that in nearly two-thirds of the cases, those based on the means for the individuals exceed those based on the means for the devices. Figure I graphically reveals the extraordinary wide differences among some individuals and the amazingly small differences among others when their duplicate counts, using the same device on the same plate, were compared.

The causes of error in counting are (1) failure to know what to count, (2) failure to see the colonies, and (3) carelessness. The use of a device whereby illumination can be secured from the two opposite sides and in

which the lens is held at a certain distance from the plate seems to give the most satisfactory results. A pasteboard Wolffhuegel guide plate is preferred to a glass one on account of the glare caused by artificial illumination. The count is relatively more uniform and much higher than those secured without artificial illumination. Lower counts have been secured when the engraver's lens which magnifies  $2\frac{1}{2}$  diameters was used both with and without artificial illumination. Figure II shows an instrument which has given satisfactory results. There may be other

instruments on the market which will give more accurate results, but in the interests of uniformity as well as practicability, it is felt that some modification of the one shown in Figure II will be satisfactory.

The results of the contests also indicate that individuals should be able to duplicate their own counts on the same plate within 5 per cent and that they should duplicate the results of others on the same plate within 10 per cent. A few of the laboratory workers have demonstrated their ability to do this.

## VITAL STATISTICS

**Abortion in Austrian Hospitals—**Interest in the declining birth rate, together with the problem of abortion, led to an inquiry by the Austrian Public Health Service into the 9,000 cases of abortion which occurred during 1929, chiefly or entirely in the hospitals of this country. While this number is not identical with the actual number of abortions in Austria it is sufficiently large to be representative, and to serve the purposes of the inquiry which were to show the dangers associated with miscarriage, and to gain an insight into social conditions.

The largest number of cases of abortion occurred among unmarried women of the age groups 21-25, and among married women of the age groups 26-30. The abortion occurred in 80 per cent of the cases in the 2d and 3d months of pregnancy, no difference being observable between married and unmarried mothers. In 9.6 per cent of the abortions, pathologic sequels developed; in Vienna alone, the proportion

was more favorable, 5.9 per cent. The case mortality was 0.75 per cent (Vienna, 0.60 per cent), another proof that the care in the city hospitals gives better results. However, inquiries in the gynecologic departments revealed that the figure 9.6 for the percentage of patients suffering from after-effects of abortion is much too small.

From the personal histories of patients in any hospital of the kind, one can find in much more than 10 per cent the anamnesis that the present disorders are traceable to a previous abortion. Many cases of chronic endometritis and parametritis remain long latent. Also menstrual and other disturbances must frequently be ascribed to a former abortion.

In the 9,000 cases, death ensued in only 0.75 per cent, whereas in the combined statistics of hospitals among the causes of death, as affecting the patients in general, abortion is put down at 2 per cent. According to general statistics, as well as from the study of the

9,000 cases, it is revealed that especially the first pregnancy results in abortion (about 25 per cent).

It is not so rare for women to have from 10 to 12 abortions; indeed, there were in this series of 9,000 cases two women in whom 15 miscarriages and one woman in whom 16 miscarriages were observed. As to whether sterility is a frequent result of injuries due to abortion, only more extensive statistics can decide; but there are many indications that such is the case. It must be emphasized that these statistics, published for the first time, can lay no claim to completeness. They include not more than 10 per cent of the abortions in Austria and are to be taken as a first attempt toward the solution of this problem.—*J. A. M. A.*, 97: 1478-1479 (Nov. 14), 1931.

**Tuberculosis Mortality and the Decline in the Birth Rate**—Among 15 states those that show a more than average decline in the birth rate tend to show also a more than average decline in their mortality from tuberculosis; those with a relatively small decline in their birth rate have likewise a relatively small decline in tuberculosis mortality. For instance, in Germany the birth rate between 1913 and 1928 fell from 27.5 to 18.6 per 1,000. The death rate from tuberculosis fell from 14.3 to 8.8 per 10,000. In Japan the birth rate over the same period was virtually stationary, and the decline in tuberculosis mortality negligible. The same parallelism can be shown in cities, and is illustrated by the statistics of Paris and Berlin.

With the fall in the birth rate the high point of tuberculosis mortality among women of childbearing ages has shifted back from ages 30-39 in 1896 to 20-24 in 1926 (statistics from Prussia). This change, it is suggested, is related to the earlier period of life at which, owing to the fall in the birth rate,

childbearing ceases.—O. Glogauer, *Tuberkulosesterblichkeit und Geburtenrückgang*, *Ztschr. f. Tuberk.*, 60: 7-15, 1931; *Bull. Hyg.*, 6: 681 (Sept.), 1931.

**Maternal Mortality in Holland**—Although according to official statistics Holland counts among the countries with the lowest maternal mortality, since the period 1916-1920, a considerable increase in the death rate has been noticed. The mortality following infection was about 7 per 10,000 confinements. The total mortality after confinements was 20-30 per 10,000. These figures were obtained from various local sources and corresponded on the whole with official statistics. It was difficult to find with certainty how this rise of mortality was brought about, but an important part may have been played by an increase of the number of miscarriages or induced abortion and sepsis, by a relatively larger number of primiparae and possibly by late marriages.—D. G. Wesselink, *De kraamvrouwensterfte in ons land*, *Nederl. Tijdschr. v. Geneesk.*, 75: 1555-1565, 1931; *Bull. Hyg.*, 6: 672 (Sept.), 1931.

**Inquiry on Infant Mortality in Chile**—An investigation of infant mortality in Chile included the following districts: Santa Ana (urban) and Hipodromo Chile (suburban), in Santiago; San Bernardo, a small village, and San Isidro (rural), contiguous to Quillota.

The districts of Santiago and San Bernardo have common characteristics: They are situated at 520 and 573 meters, respectively, above the level of the sea and have an exceptionally mild climate, with an average temperature of 13.8° C. (56.8° F.); frequent rains in winter and none in summer. The two districts of Santiago have a supply of pure water drawn from the Laguna Negra, which has a capacity of 100,000,000 cu. m.; both have a water carriage system of drainage. The district

of Santa Ana, with a population of 47,800, is divided into two sections. The southern section is composed of a wealthy or semiwealthy population; the northern section is principally inhabited by a poor, uncultured people, living in miserable, unhealthy conditions. The Hipodromo Chile District, with a population of 32,100, covers an area 4 times as large as the aforementioned district.

In December, 1927, the town of San Bernardo had a population of 10,296, a birth rate of 46.72 per 1,000 inhabitants, an infant mortality rate of 274.4 per 1,000 live births and a general death rate of 27.08 per 1,000 inhabitants. With climatic conditions similar to those of Santiago, it has an inadequate supply of excellent drinking water, drawn from the stream "El Canelo"; it has no sewerage, the drainage water going to filtering cesspools. Hygienic conditions are generally poor; poverty is prevalent, though not to such a degree as in the larger towns.

San Isidro, a rural district in the Department of Quillota, had a population of 4,600 inhabitants in December, 1927; a birth rate of 43 per 1,000 inhabitants, an infant mortality rate of 267.7 per 1,000 live births and a general death rate of 33.2 per 1,000 inhabitants. The average temperature is 14.2° C. (57.5° F.). The water supply is poor, pollution being made possible through the refuse water which is usually spilt in the street channel or on the ground.

Infant mortality during the first month, and particularly during the first week of life, which includes more than a third of all deaths, is generally due to obstetric traumatism and prematurity. Digestive diseases account for 28.2 per cent of all deaths, and acute respiratory diseases cause 26.2 per cent, the rate being higher in summer than in winter, probably because of the daily variations in temperature, which sometimes reaches 15.2° C. (59.5° F.) in Santiago and 14.8° C. (58.6° F.) in Quillota. Con-

genital syphilis, which was present in about two-thirds of the cases of specific infectious diseases, caused 8.7 per cent of the total number of deaths; syphilis was also the greatest cause of stillbirth; this shows the need of strengthening antivenereal measures.—Louis Calvo Mackenna, *Bol. d. Inst. internat. am. de protec. a la inf.*, 4: 426, 1930; *Am. J. Dis. Child.*, 42: 937 (Oct.), 1931.

**A Study of the White and Negro Infant Mortality in Maryland, 1916–1930 Inclusive**—A study of infant mortality in Maryland showed changes in the numbers and causes of deaths among white and negro infants, during the period 1916 to 1930 inclusive. The total experience has been considered in its entirety and has been divided into two periods of 1916–1923 and 1924–1930 for purposes of comparison.

The trend of birth rates in both the white and negro populations of Baltimore City and the counties has been downward. The mean rate per 1,000 population in the state for the period 1916–1923 was 23.94 for the total population, 23.37 for the white, and 26.73 for the colored population. For the period 1924–1930 it was 20.37 for the total population, 19.49 for the white, and 24.63 for the colored.

The trend of infant mortality in all parts of Maryland has been downward. The mean rate for the white race in the state for the period 1916–1923 was 93.6; and for the period 1924–1930 it was 70.7, a reduction of 24.5 per cent. In the negro race, the mean rate for 1916–1923 was 174.0 and for the period 1924–1930 it was 130.9, a reduction of 24.8 per cent. The mean rate of infant mortality in Baltimore City during the 1924–1930 period was 27.4 per cent lower for the white race than in 1916–1923. For the negro, the reduction was 27.0 per cent. In the counties, while there was a marked decline, the decrease was not so great as in Baltimore

City. The reduction was 21.2 per cent for the white population and 21.3 per cent for the negro.

A study of the principal causes of infant deaths in Maryland shows a reduction in each of them for the white and negro races, with a few noted exceptions. When the rates for the second period are compared with those for the first, the only cause of death showing an increase for the white race was injury at birth (8.1 per cent).

In the two periods, little change is found in the infant death rates from premature birth and from "other diseases of early infancy." Congenital malformations and debility showed a marked change, with a reduction of 28.2 per cent in the white and 26.2 per cent in the negro race.

Respiratory diseases showed a reduction of 16.1 per cent in the white and 15.2 per cent in the negro population; tuberculosis alone showing a decline of 31.3 per cent in the rate for the white race, and 25.3 per cent for the colored.

The most marked decrease in infant death rates, among both the white and negro races in the state, occurred in the deaths due to gastrointestinal diseases,

with a reduction in the rates of 48.0 per cent for white infants and 41.3 per cent for the negro. These reductions are of special significance in view of the fact that this group of diseases is regarded as preventable and also because decreased morbidity from this cause results in a decrease of deaths from other causes. This reduction has been more marked in Baltimore City, where both white and negro death rates from this cause are lower than for the counties.

In 1930, the infant mortality rate for the white population of the state was 63.1 per 1,000 live births and that for the negro was 121.5, the rate for negro infants being almost twice that for the white race.

In both periods, the excess of the negro death rates is most marked for syphilis, tuberculosis (all forms) and the group of respiratory diseases. Injury at birth shows the least difference. In the period 1924-1930, the negro infant mortality is 1.7 times higher than the white in Baltimore City, and in the total counties the negro rate is twice as high as the white.—*Child Health Bull.*, American Child Health Association, 7: 206-211 (Nov.), 1931.

# PUBLIC HEALTH ENGINEERING

**Observations of Water Supplies of London and Paris**—A very brief description is given of visits to the water works of Southend, Kempton Park, London, and Ivry and St. Maur, Paris. At Southend the water is treated with lime and alum, agitated, settled, recarbonated and filtered. Lime is recovered and the surplus sold. Experiments on the addition of activated carbon to the water before filtration are being carried out. At the Kempton Park plant compressed air is produced by pressure from the high water tanks. Rapid sand filters have been introduced to increase the capacity of the slow sand filters.

At St. Maur the ozonization plant, which had to be put out of action during the war because of the cost of fuel, is still intact, and may be used again. Liquid chlorine and javel water (sodium hypochlorite) are used for disinfection at Ivry. Experiments with rapid filters are being made at St. Maur. All water used in Paris is now filtered and disinfected.—E. J. Bartow, *J. Am. Water Works Assn.*, 1931. From Summary of Current Literature, *Water Pollution Res.*, IV, 10: 333–334 (Oct.), 1931.

**Water Softening**—The disadvantages of hard water are discussed and the three methods of softening, namely, distillation, precipitation and base exchange, are described. Distillation produces a very fine soft water, and is sometimes used for treating boiler feed waters, but is too costly for general use. The precipitation method has a fairly wide application in industries where complete softening is not essential and where the skilled supervision necessary for regulation of dosage and prolonged storage are practicable. Plants may be

of the cold or hot type, the latter being speedier, requiring smaller equipment and giving better softening.

For correcting temporary or bicarbonate hardness, lime alone is used, while for permanent hardness, caused, for example, by calcium or magnesium sulphate, soda ash must also be added. The addition of sodium aluminate may accelerate the process and produce softer water.

Under optimum conditions the cold process reduces hardness to 4–6 gr. per gal., while the hot process reduces it to 2–3 gr. per gal. Base-exchange is growing in popularity because of its adaptability, efficiency (hardness is reduced to zero), simplicity of operation, automatic adjustment for water of varying hardness, and ease of regeneration. The zeolite used is a sodium aluminium silicate and softening is effected by the exchange of the sodium for calcium and magnesium in the water. The plant employed and its operation are described. The zeolite is regenerated by washing with a solution of sodium chloride. Apparatus for controlling and effecting regeneration is described and illustrated by a diagram.—Crane, Ltd., Montreal, *Technique*, 1931. From Summary of Current Literature, *Water Pollution Res.*, IV, 10: 342–343 (Oct.), 1931.

**The Water Resources of America: Work of the Geological Survey of the U. S. A.**—The administration and finance of the investigation of the water resources of America are discussed. The study of surface waters is carried on at gauging stations and consists primarily in the measurement of the flow of streams. Investigations on

ground water deal with its occurrence, quantity, quality, and head, its recovery through wells and springs and its utilization.

Research into the principles of ground water hydrology is in progress. New apparatus has been constructed by C. H. Au, for exploring leaky wells for salinity of water at all depths by the electrolytic method. Further investigations deal with analyses of the mineral contents of both surface and underground water.

Reference is made to reports on the production of electricity; consumption of fuel by power plants, developed water power of the United States, etc.—N. C. Grover, *Water & Water Eng.*, 1931. From Summary of Current Literature, *Water Pollution Res.*, IV, 10: 352-353 (Oct.), 1931.

**A Complete Treatment of Sewage from Packing Houses by Super-chlorination**—A plant for the separate treatment of packing house effluents at Austin, Minn., is described. The flow of concentrated waste (12 times as strong as domestic sewage) is 750,000 gal. a day. The waste flows through a grit chamber and preliminary settling tank, the scum from which is removed for soap recovery to a mixing tank where chlorine is added.

Another mixing tank follows, giving a total mixing time of 20-30 minutes. The secondary settling chamber gives a detention time of 3 hours. The sludge from both settling chambers is mixed, filtered and dried. Its market value for feeding is expected to make the plant self-supporting. The effluent is clear and odorless and the condition of the river has greatly improved since the installation of the plant.

Packing house odors are also controlled by this process, which should be specially suitable if the waste is finally to be mixed with domestic sewage. The method is much cheaper than treatment

by biological methods either separately or with domestic sewage.—H. O. Halvorson, *Am. City*, 1931. From Summary of Current Literature, *Water Pollution Res.*, IV, 10: 360 (Oct.), 1931.

**A General Review of the United States Bureau of Mines Stream Pollution Investigation**—The report contains general facts and information on coal mine drainage. Streams representative of mining areas containing bituminous coal with low to average sulphur content and with high sulphur content were studied, attempts being made to determine variations in acidity and seasonal variations in mine drainage. Not only do acid waters require neutralization and subsequent softening, but the chemicals used in these processes and remaining in solution in the water cause "foaming" and "priming" of boilers. Fluctuations in the volume and strength of acid wastes increase difficulties of purification. The gravity of the problem of mine drainage is illustrated by a reference to the Indian Creek law suit in Fayette County which resulted in the sealing of a number of mines.

Acid formation in coal mines is due to the oxidation of iron pyrites to soluble iron sulphate which on hydration and oxidation forms sulphuric acid and iron oxide. The amount of pyrites varies in different parts of a coal bed, causing variations in the acidity of drainage. Outside gob piles cause increased acidity as they are composed largely of pyrites thrown out when mining or cleaning coal.

The efficacy of rock dusting as a method for decreasing acidity by neutralization is discussed. Acid wastes are harmful to fish, for, besides being toxic, they reduce the oxygen content of the water and their irritating effect on the gill follicles may be fatal. More than 4 p.p.m. of mineral acids will kill trout. Deposits on the bottom of streams resulting from pollution inhibit



fish propagation. Non-acid coal mines are referred to.

It is suggested from experience of mines and from laboratory tests on iron sulphide that sealing of mines excludes oxygen and prevents acid formation.—R. D. Leitch, Report of Investigation, Dept. of Commerce, Bureau of Mines, April, 1931. From Summary of Current Literature, *Water Pollution Res.*, IV, 10: 361–362, 1931.

**The Water and Sewerage Works of Moscow**—Describes an inspection of water supply and sewerage conditions in Moscow undertaken for the purpose of reporting projects for extensions. The 1929 population of Moscow was 2½ millions and plans are being made to deal with a population of 6 millions by 1950. The development of the water supply is briefly described. At present this consists of a well system furnishing about 7 m.g.d. and a supply of about 60 m.g.d. from the Moscow river.

The filtration plant for the latter supply comprises pumping plants, 6 sedimentation tanks, with 10-hour retention period, 80 pre-filters treating about 49 m.g.d. per acre, and 22 slow sand filters, operating at 4 m.g.d. per acre.

A sanitary protective zone extends for 50 miles up the river above the intake and all villages, factories, etc., in the zone are under the supervision of officers responsible for their sanitation. The general control of water supply is in the hands of the Commission for Control of Drinking Water and Sources of City Water Supply, the constitution and functions of which are described. All works have well equipped laboratories and are strictly controlled by routine tests.

The author speaks very highly of the water works personnel and of the general appearance of the plants. All supplies in Moscow are metered. Careful studies have been made of the possi-

bilities for future extensions. Supplies from the Oka and the Volga have been considered but the method decided upon is to increase the supply from the Moscow river by impounding reservoirs on the river and its tributaries.

The sewerage and sewage treatment systems comprise a separate sewer system, pumping station, irrigation plants at Lublino and Lubertzy, and an aeration plant at Koguhovsky. The oldest plant at Lublino is seriously overloaded and about 1 m.g.d. are treated by settling and contact filters. The newer Lubertzy plant gives excellent results. These plants treat about 90 per cent of the total flow. Only part of the sewage is settled before being deposited on land but settling tanks and separate sludge digestion tanks are planned. There is an experimental biological plant at Lublino and an activated sludge plant and trickling filter at Koguhovsky, treating about 3½ m.g.d., is also regarded as experimental. The trickling filters are aerated by a forced air method and work at 8–10 times the customary European rates for strong sewage.—I. S. Walker, *J. Am. Water Works Assn.*, 1931. From Summary of Current Literature, *Water Pollution Res.*, IV, 11: 368 (Nov.), 1931.

**The Use of Active Carbons for the Purification of Drinking Waters**—Active carbons, their manufacture, properties and purifying effect are dealt with. The treatment is becoming more widely used for the purification of surface water supplies, and produces a perfect tasting drinking water. Sauer at Amsterdam first suggested the use of powdered carbons for removal of bacteria and purification of water.

Later Imhoff and Sierp used granular active carbon for the purification of the city of Hamm water supply and chlorphenol tastes were eliminated. The Hydraffin filter used, which contained about 6 tons of Hydraffin, is described,

the amount of water treated being 24,000-30,000 c.m. per day. Reactivation of the carbon is only necessary every 15 months. The filter is cleaned monthly by counter flushing and occasionally regenerated by steaming.

A similar filter to that used at Hamm has been installed at Dresden to eliminate tastes in the Elbe waters. This filter is illustrated by a diagram. At Magdeburg powdered carbon has been spread on the slow filters, but this has the disadvantage of offering great resistance to the passage of the water. Purification by the "stirring in" method of applying active carbon has been used with success at Southend. In the United States highly satisfactory results have been obtained from active carbon filters and their extensive future application is certain.

The use of activated carbon for dechlorination after superchlorination is dealt with. The process is a chemical reaction rather than one of adsorption, the chlorine reacting with water in the presence of active carbon to form hydrochloric acid which is neutralized by the hardness of the water. When the dechlorinating capacity of the carbon diminishes it may be restored by washing with a hot soda solution, to which chlorine may be added, after which neutralization may be effected with calcium chloride solution, calcium carbonate being formed.

The first large water works dechlorinating plant using carbon began operation at Aussig on the Elbe in 1930. This plant and others at Stuttgart and Ludwigshafen are described. For the removal of organic matter, more particularly humic acid compounds, aeration or biological treatment must precede active carbon treatment as saturation of the carbon is relatively rapid with organic compounds.

Resistance of carbon filters to water, choking of filters and their clearing

by counter-flushing or washing with dilute hydrochloric acid are described and the cost of active carbon treatment is discussed.—J. C. Liddle, *Water & Water Eng.*, 1931. From Summary of Current Literature, *Water Pollution Res.*, IV, 11: 372 (Nov.), 1931.

**A Field Method for the Estimation of the Salinity of the Water in Mosquito-Breeding Places**—In anti-malarial work, the bionomics of mosquitoes form such an essential part that such accuracy of information as is consistent with practicability is desirable. The author suggests a simple means of securing accurate information on the salinity of water. His scheme is the simplification of the ordinary water analysis technic for the estimation of chlorides in water.

Using a 10 c.c. pipette graduated in 0.5 c.c., the delivery point is cut off and the other end is sealed so that with the pipette in an inverted position, there will be an exact number of c.c. contained in the ungraduated portion of the pipette; that is, in the portion below the zero mark. The pipette thus prepared actually is the field test tube.

Two solutions of silver nitrate are prepared; one of such strength that a c.c. will precipitate 2 mg. of chlorine and another so that 1 c.c. will precipitate 10 mg. A saturated solution of potassium chromate is also prepared.

The technic consists of filling the tube to the zero mark with the water to be tested, adding 2 drops or so of the chromate solution, and then adding silver nitrate solution, a few drops at a time, until the yellow color disappears and a permanent faint red remains. The amount of silver solution used is then read off the graduations of the inverted pipette to the nearest 0.5 c.c. The parts of chlorine in the sample can then readily be calculated, taking into consideration, of course, whether the weak or the strong silver nitrate solu-

tion was used in the test.—J. A. Sinton and N. D. Kehar, *Indian J. Med. Res.*, 18, 1 (July), 1930. From *Public Health Eng. Abstr.*, XI: Ma: 5 (Mar. 7), 1931.

**The Sea Discharge of Sewage—**Report of a paper presented at the Royal Sanitary Institute Congress, July, 1931. The relative advantages of collection of sewage from the various places in a district and its discharge through a main outfall sewer into the sea, and of separate treatment for each place followed by discharge of the effluent into the river are discussed from the financial aspect and from the point of view of satisfactory purification. Besides the cost of construction of the outfall sewer the effect on the river flow of diverting the sewage flow must be considered.

The risks incurred in discharge of sewage into the sea, such as pollution of beaches, injury to boating, bathing and fishing, etc., are mentioned. The question whether the dilution of sewage by sea water will be sufficiently large and prompt to accomplish oxidation of sewage before it can be harmful or offensive is discussed. Rate of dilution can be investigated by observations of tides and currents as indicated by floats. The dilution of sewage in tidal rivers and on a flat beach is considered.

Except under the most favorable conditions, sewage should be screened before discharge into the sea. Screening, however, removes less than 10 per cent of the suspended matter, while if the sewer is long much less will be retained owing to disintegration during transit. Before arranging for discharge of sewage into the sea careful investigations should be made as disadvantages may outweigh advantages.—G. Thomson,

*Munic. Eng.*, 1931. From Summary of Current Literature, *Water Pollution Res.*, IV, 11: 389 (Nov.), 1931.

**The History of Sleeping Sickness in the Sudan—**This is an interesting account of the methods used to control sleeping sickness in the Sudan and the article should be read by those interested in insect-borne diseases.

It has been found that the most satisfactory method is to concentrate the sick people in villages or along roads adjacent to streams that can be kept clean and free from vegetation. This method makes use of the fact that wild and uninhabited country abounds in the fly carrier of the disease while concentrated groups under good surroundings and open streams are not invaded by flies. These measures were used to prevent the spread of infection rather than being aimed at the center of the epidemic.

The various superstitions of the people and their tribal customs were gradually overcome and adjusted to this new method of living and the task of extirpating a disease has in fact profoundly affected the life of the people. Up to the end of 1928 over 5,400 cases of sleeping sickness were treated in the Sudan. Where sleeping sickness had gained a footing a considerable epidemic was brought under control in the space of 2 years, and infection shut out from a district 5 times the size of Wales. The author considers the methods used to be effective and states that the epidemic lingered only where the medical and administrative staff was inadequate.—G. K. Maurice, *J. Roy. Army Med. Corps*, 55, 4: 241–259 (Oct.), 1930. From *Pub. Health Eng. Abstr.*, XI: Ma: 5 (Mar. 7), 1931. Abstr. H. A. Johnson.

## FOOD AND NUTRITION

The Effects of Radiant Energy on Milk Anemia in Rats—Two different types of radiant energy were compared in this experiment on rats suffering from nutritional anemia. The stock diet consisted of a commercial meal supplemented by lettuce, and the milk diet was prepared from commercial powdered milk in a solution containing 12.5 per cent of solids. Hemoglobin determinations and weighing of rats occurred once a week. The sources of radiant energy used were a "Pan-Ray-Arc" burning National Therapeutic A "Sunshine" carbons and an air cooled Cooper-Hewitt quartz mercury vapor lamp. A group of 16 rats were exposed to sunshine for  $\frac{1}{2}$  hour daily during June and July. Using the quartz mercury vapor lamp, the differences in hemoglobin between the irradiated and non-irradiated groups were not great. The mean value for animals surviving 10 weeks or longer is 8.29 gm. in irradiated animals, against 5.80 gm. in the controls. Irradiation with the flaming carbon arc resulted in hemoglobin values only equal to or lower than the controls. The group of rats exposed to sunshine had hemoglobin values in 7 weeks slightly higher than in control rats exposed only to subdued daylight, 8.4 gm. as compared with 6.7 gm. While the iron input was low, the rats were undoubtedly getting sufficient to maintain a balance at low hemoglobin levels. In some experiments, iron was added to the diet, but hemoglobin regeneration was no more rapid than in the controls. —Paul C. Foster, *J. Nutrition*, 4: 517 (Nov.), 1931.

**Viosterol and Cod Liver Oil—**  
In this study, viosterol was compared with cod liver oil on 3 groups of rats

on 3 different diets. In the first series, diet B consisted of a purified ration with 80 mg. of yeast; diet D, the same plus  $\frac{1}{2}$  drop of viosterol daily, and diet C the same plus  $\frac{1}{2}$  drop of cod liver oil daily. The rats were on this diet from 54 to 62 days. The average weight at the beginning was approximately 72 gm., and at the end of observation, 55.1 gm. on the B diet, 58.2 on the D diet, and 80.6 on the C diet.

Another series was run in which the B diet was supplemented with  $\frac{1}{2}$  drop of cod liver oil and  $\frac{1}{2}$  drop of viosterol daily after xerophthalmia developed.

Another series contained 3 variations of the diet, Bb, the ration plus 80 mg. of yeast daily; after xerophthalmia,  $\frac{1}{2}$  drop of cod liver oil and  $\frac{1}{2}$  drop viosterol daily, and diet Bc, the ration plus 80 mg. of yeast daily; after xerophthalmia developed  $\frac{1}{2}$  drop of cod liver oil daily, and diet B, the ration plus 80 mg. of yeast daily. The xerophthalmia was cured in an average of  $5\frac{1}{2}$  days on the modified diet. The D diet was comparable with the modified D diet in that  $\frac{1}{2}$  drop of cod liver oil was added daily after xerophthalmia developed. The second series of the experiment on the purified food was supplemented with 1 gm. of yeast daily and otherwise modified with viosterol and cod liver oil as in the preceding. The rats developed greater weight gains with the additional yeast but developed xerophthalmia except where cod liver oil was added.

Rats on the B and D diets in the second series showed pus in the nasal sinuses and abscesses on the tongue but not on the C diet containing the cod liver oil. The quantity of viosterol administered was alleged to contain the same antirachitic potency as cod liver

oil but this amount did not produce as good calcification. In the rats which developed xerophthalmia there were an inflamed respiratory tract, discolored liver, and spleen and other abnormal conditions of the organs. The addition of viosterol increased calcification of the bones but did not prevent or cure xerophthalmia.

The addition of cod liver oil not only cured xerophthalmia but produced a better calcification of the bones. The authors conclude as follows:

Since "colds," malnutrition and intestinal inadequacies are more frequent in children than rickets, this study emphatically suggests that the apparently widespread substitution of viosterol for cod liver oil in the diet of the child is not logical and may result in an appreciable decrease of the child's strength and resistance to infections.—

E. O. Prather, Jr., Martha Nelson, and A. Richard Bliss, *Am. J. Dis. Child.*, 42: 52 (July), 1931.

**Value of the Oyster in Nutritional Anemia**—Many other metallic elements besides copper have been studied in connection with hemoglobin regeneration in nutritional anemia with somewhat conflicting results, although a general agreement that both copper and manganese are effective in supplementing iron. The oyster contains these elements, with others, and in addition contains iodine, vitamins A, B, C and D. This experiment was undertaken to see how effective the oyster would prove as an anti-anemic food.

Rats were fed the Sherman diet consisting of whole wheat, whole milk powder, meat scrap and salt, containing 125 mg. of iron and 4.1 mg. of copper per kg. The average hemoglobin value for the experimental rats was found to be 11.79 gm. per 100 c.c. of blood. Rats were rendered anemic with commercial whole milk powder and sufficient water to reconstitute average milk.

In the period from 6 to 8 weeks the average hemoglobin value of the milk-fed diet had decreased to 5.68 mg. per 100 c.c. of blood, as compared to the stock ration at that time of 15.3 gm. The anemic rats were divided into groups.

Oysters from the South Carolina coast were shucked and dried in the laboratory and analyzed for copper, iron and manganese. Composite samples of dried oysters containing 892 p.p.m. of iron, 58 p.p.m. of copper, and 20 p.p.m. of manganese, were fed at a daily level of 0.56 gm., the highest dose, to 0.14 gm. the lowest. In addition, 3 concentrations of a hydrochloric acid solution of oyster ash were prepared, corresponding in iron, copper and manganese to the levels of the dried oysters. Both the dried and the oyster ash showed practically the same hemoglobin regeneration. The hemoglobin value on a maximum dosage rose rapidly with complete regeneration in 2 to 3 weeks. In 4 to 5 weeks, there was regeneration with the 0.28 gm. dosage. The 0.14 gm. dosage failed to restore hemoglobin to normal value.

At the end of the 8-week period, the average reached 12.0 mg. per 100 c.c. or approximately 80 per cent regeneration. In addition, a prepared solution of iron, copper and manganese resulted in approximately the same hemoglobin regeneration as when fed dried oyster or oyster ash on the same copper, iron and manganese basis.—Harold Levine, Roe E. Remington, and F. Bartow Culp, *J. Nutrition*, 4: 469 (Nov.), 1931.

**The Pellagra-Preventive Value of Canned Spinach, Canned Turnip Greens, Mature Onions, and Canned Green Beans**—In testing canned spinach, a California brand was used, and a daily allowance of 482 gm., including the can liquor, was permitted. A table gives the composition of the basic diet in each of the tests made. This spinach-supplemented diet was given to 16

colored female inmates of the State Hospital at Milledgeville, Ga. Fourteen of these remained under observation for 1 year and one developed symptoms of pellagra near the end of the 11th month.

The same test was made with canned turnip greens. In this experiment, 16 inmates were used, 15 of whom were under observation for 1 year. No symptoms of pellagra were observed.

A commercial variety of red onions was used. The dry outer skin was removed and the remainder chopped and steamed until done. Table salt to season was added. Each patient was given 525 gm. per day with the same basic diet as in the tests with spinach and turnip greens. Ten white female inmates were used. Five developed pellagra within 3 months. When the 5th case appeared the test was discontinued.

In testing canned string beans, 550 gm., including the can liquor, were given daily. Fourteen white female inmates were used, 12 of whom were under observation for a significant period. Two developed pellagra within 7 months, 1 during the 8th month, and 4 during the 9th month, at which time the test was discontinued.

It will be noted from these tests that canned green beans and mature onions are a very poor source of the pellagra preventive vitamin, while canned spinach and canned turnip greens, though not especially rich in it, are considered an important contributory source of this factor.—G. A. Wheeler, *Pub. Health Rep.*, 46: 45 (Nov. 6), 1931.

**The Effect of Partial Depletion of Vitamin B Complex upon Learning Ability in Rats**—Complete depletion of the vitamin B complex results either in beri beri or pellagra, and with partial depletion a nervous derangement may result in children and not in adults. While beri beri is prevalent in the Orient, it has occurred in Newfound-

land, Labrador and Norway, and is not confined to a rice diet. Flour and other milled cereals and highly refined foods are notably deficient in vitamin B complex, constituting a nutritional problem in the case of children.

With these facts in mind, an investigation was undertaken to study the effect of partial depletion of vitamin B complex on rats. The animals were depleted during the nursing period by depleting the diet of the mothers, during nursing, in yeast and wheat germ and feeding the young a diet first deficient in and later free from vitamin B complex.

Four groups were studied: (1) controls on normal diet, (2) depleted of vitamin B complex through the mothers' diet until weaning, (3) mothers on depleted diet but young on rich vitamin B diet, and (4) young depleted during the nursing period and from parents depleted of vitamin B in their early life. After weaning, the rats were given a vitamin-rich diet and the body weight brought near to the controls. After the controls were weaned, the growth was checked with a vitamin-B free diet for a brief period and then each group placed on the same diet of vitamin B-free food plus brewer's yeast.

After 21 days, or at the age of 70 days, the rats were trained in a standard maze once a day for a week and then required to run the maze once daily the first 3 days, then two trials daily until the problem was learned, the criterion being 8 correct out of 10 problems.

A brief summarization of the scores shows that the animals depleted of vitamin B through the mother's nursing diet were inferior to learning to the normal animals with large differences. The offspring of rats which were depleted of vitamin B complex in early life and again depleted during their nursing period were much inferior in learning ability. The offspring of depleted animals

on a vitamin B-rich diet showed adaptability equal to that of normal animals, suggesting that the learning ability of the second generation is not affected by early depletion of vitamin B of the first generation.

The offspring of animals depleted during the nursing period have a learning ability equal to that of the parents, indicating that the detrimental effect is probably not hereditary but traceable to the dietary factor.

Several references to the literature are quoted in which the dietary factor of

malnutrition in the nervous mechanism of children is discussed. These investigators believe that the investigations on children indicate a definite relationship between dietary deficiency and higher nervous functions and believe that with the prevalence of highly milled flours and refined cereals it is necessary that vitamin B complex should be supplemented in the diet of expectant and nursing mothers as well as of the infants and children.—Siegfried Maurer and Loh Seng Tsai, *J. Nutrition*, 4: 507 (Nov.), 1931.

# INDUSTRIAL HYGIENE

Medical Service of the Bell Telephone Company of Canada—The company occupies about 140 buildings in which questions of ventilation, heating, lighting, sanitation, etc., appear. In addition, it endeavors to ameliorate the home living conditions of its people through the method of instruction.

"Our Plan," as it is called, was inaugurated 15 years ago to cover medical services, sickness disability benefits, pensions, death benefits, etc. The endeavor is made to treat all employees alike. The medical work includes: First aid in which we are affiliated with the St. John's Ambulance Association, and the company now has 4,500 fully trained to render first aid anywhere; accident prevention work in which there is a continuous campaign and which has yielded remarkable results; and a health course for women leading to a certificate of proficiency, with quite satisfactory outcome.

Employees make no payment toward this plan or for any medical service rendered, although the company treats only minor and emergency conditions, referring usual sickness and fee arrangements to outside doctors. The plan provides for the payment of wages during sickness on a graduated scale (particulars given).

The medical department is under the direct supervision of the senior vice-president and comprises a medical adviser, a medical examiner in Montreal, and another in Toronto, all of whom are part-time salaried employees; 2 full-time nurses (although there are several other nurses engaged mostly in welfare work); 3 accident surgeons in Montreal and 3 in Toronto; and 120 doctors at other points in the company's territory, all paid on the basis of the work they

are called upon to do. Mutually agreeable arrangements are also made with outstanding specialists in various departments; e.g., X-ray, biochemistry, chest conditions, etc. These persons do indicated work, the expense of which is borne either by the employee or the company at the discretion of the medical adviser.

With this medical machinery there is maintained: (1) general supervision of sanitary matters throughout buildings; (2) the same in connection with construction camps, with the finest coöperation on the part of the provincial boards of health; (3) advice to all departments of the company, especially the legal and personnel departments; (4) examination and medical classifications of all applicants for positions—the 4-class system being used, viz., (*a*) those physically suited for the position desired, (*b*) those physically unsuited for the position desired, but able to be placed in some other kind of work—in which placement a benevolent attitude is maintained, (*c*) those physically fitted but who need surgical or medical aid to correct unsound conditions, and (*d*) those not physically suited for any position—in which experience has shown comparatively few cases occur and these unemployable people will probably have to be looked after sooner or later by the State; (5) the carrying of all accident cases to a conclusion; (6) coördination and coöperation regarding medical reports to attending physicians; (7) the making of physical examinations for outside physicians, using the special equipment which the company has, care being taken to observe all ethical considerations; (8) in the Montreal and Toronto areas, the perfection of arrangements whereby any employee may



apply for a medical examination and advice; and (9) the maintenance of service for minor medical or surgical conditions.

The author concludes as follows:

1. It is my belief that no industrial or commercial organization is justified in maintaining a medical service that is not financially profitable.

2. A well designed and well conducted medical service is a profitable venture for any company with 1,500 employees or over.

3. A fairly extensive experience has convinced me that such a service can be maintained without conflict with private practitioners, if reasonable ethics are practiced.

4. When a medical service is carried on along the lines indicated in my remarks, I believe it cannot fail to be conducive to public welfare.

—A. R. Pennoyer, M.D., Medical Director, The Bell Telephone Company of Canada. Abstract of paper presented before the Industrial Hygiene Section of the A. P. H. A. at the Sixtieth Annual Meeting at Montreal, Sept. 16, 1931.

E. R. H.

**The Significance of Industrial Health**—Perhaps half a century after the beginning of the modern public health movement, industry began organizing departments of preventive medicine. Industrial health is the fourth step in evolution of such services, being preceded by first-aid to the injured, a first-aid office within the plant, and compensation. We, as health officers, saw diseases against which we warred decreasing, in the list of the ten most important, but accidents gradually working their way to the top, yet recognized as preventable.

We are sorry that the National Safety Council developed its task so apart from health departments, as it could have learned more economically from our experience. In the field of education we had already been experimenting a long time so that we felt that the council and the health department

would have exchanged views and experiences with profit. Nevertheless, we are glad to have the council enter the field and we admire it for the success achieved.

Logically, after accident prevention came medical care in industry, and soon the realization that limiting oneself to the care of end-products is wasteful and prevention much more economical. Today industry has fewer rights with the employee than ever before in the history of society and the relations are becoming less personal and more on a basis of economics. This is more true of health than of other features. While we think industrial health loss is no mean item in figuring costs, employers are apt to think our judgment not well balanced and that health is magnified by us.

With the disappearance of the great epidemics of history, health people have not one basis left for an emotional appeal of great power and the public mind is not prepared to support health work on the basis of judgment. Here the intervention of industry is of almost priceless value and demonstrations by industry are motivating the situation. It is also possible for industry to require certain health practices and to secure coöperation in effecting them that cannot be otherwise accomplished. Its influences are also carried into the homes. Here it is practically impossible to maintain a line of demarkation between the workman and his family when it comes to applying the principles of prevention. Thus industrial health is significant from the standpoint of future health improvement.

The earlier tasks of health work are nearly consummated—communicable diseases. Shortly health work will be concerned chiefly with the degenerative diseases in the prevention of which persons and groups must change their habits and customs. Degenerative diseases result from the acts

and attitudes of the individuals concerned and prevention is much more difficult than the matter of fighting a microbe. Comfort or cost interposes to prevent action. It is also more difficult because well people are called upon to change their habits to prevent illness. Also, because what is done must be long continued.

The health forces will continue to need the example and help of industry, such as entrance physical examinations, periodic physicals, fitting men to jobs, and others. The proof that industrial health pays is regarded as non-conclusive by some employers, but it is necessary for efficiency of labor—and not for the regulation of death rates or even the lessening of sickness rates.—William A. Evans, M.D. Paper presented before the National Safety Council, Health Division, Chicago, Oct. 12, 1931.

E. R. H.

**Lead Poisoning in Brass and Bronze Foundries**—Thirty-eight men engaged in the founding of high lead (railroad) bronze were sent to the Montreal General Hospital for various complaints. Of these, 24 were found to be suffering from acute lead poisoning; 9 others showed definite evidence of lead absorption; and only 5 showed no signs of plumbism. Railroad bearing bronzes may contain lead up to 20 per cent.

Three brass polishers who succeeded each other on the same emery wheel became poisoned with lead. The amount of lead in the alloy was below 6 per cent.

Blood smears of 26 men engaged in the polishing of low lead brass and bronze (less than 6 per cent) were examined. Five of these showed stippled cells, well in excess of 200 p.m. red cell.

The analysis of air in one foundry showed the concentration of lead in the air to be about 0.85 mg. per cu. m.

Our review of the literature of chronic brass poisoning indicates that many cases of chronic disability occur among founders and polishers of brass, and that the symptoms recorded are closely allied to those of lead poisoning.

It is our belief that lead plays an important part in the disease picture variously diagnosed as brass poisoning, bronze poisoning, and copper poisoning.—Frank G. Pedley, M.D., and R. Vance Ward, M.D., *Canad. M. A. J.*, XXV: 299–303, 1931.

E. R. H.

**Changes in the Ionic Content of Air in Occupied Rooms Ventilated by Natural and by Mechanical Methods**—This paper presents the results of a research conducted by the authors at the laboratories of Industrial Hygiene at the Harvard School of Public Health. It is pointed out that previous investigations have been unsuccessful in explaining the cause of the deadness, or lack of stimulating quality present in the air of occupied spaces.

The object of this investigation was to study the ionic content of the atmosphere in relation to ventilation and health. It will be recalled that the atmosphere consists of atoms, molecules and molecular groups (in addition to suspended dust particles) and that these elemental forms of matter are electrically charged either positively or negatively.

The ionic charges were measured by means of a modified Ebert apparatus.

Measurements of the ionic content of indoor and outdoor air disclose very definite seasonal trends; the content being much higher in summer than in winter; higher on clear days than on rainy or foggy days, and, as a rule, higher in the daytime than at night.

Studies of the ionic content of the atmosphere of small rooms showed that the content in unoccupied heated rooms did not differ much from that out of doors. In occupied rooms the ionic

content fell immediately as the room was occupied and this low level of ionic content was maintained until the occupants departed, after which a rise in ionic content immediately resulted.

A most interesting experiment was conducted in an attempt to determine the amount of air supply required to maintain normal ionic content (original content) in a crowded room. These experiments showed that 160 cu. ft. per person per minute was required in order to accomplish this end. A supply of 30 cu. ft. per person per minute did not raise the ionic content above the level attained with no ventilation.

The authors found it possible by artificial ionization to control the ionic content up to 10,000 ions per c.c.

(The authors of this paper are to be congratulated on a most careful and painstaking study in the field of ventilation research, and one which should be watched with considerable interest by persons associated with this field of endeavor.)—C. P. Yaglou, L. Claribel Benjamin and Sarah P. Choate, *Heating, Piping and Air Conditioning*, Oct., 1931, pp. 865–869. L. G.

**Manufacture of Leather Gloves—**This syllabus compiled by technically informed persons with a review of health hazards by Dr. C. P. McCord is devoted only to the making of leather gloves and does not include dyeing or leather tanning and dressing of skins and hides. The historical background of the industry, its extent and scope, and its present economic status (which is good despite the prevailing depression) are adequately discussed, while there is a section on conditions in individual plants.

The process of manufacture from the time when the skins arrive at the factory to their completion as gloves, including fur-lined gloves, is briefly described. The potential health hazards no doubt increased during the ages,

especially in the days when gloves were often termed "digitalia" (prior to the 11th century), but have been left largely behind with the tanner and dyer. There are still objectionable elements in glove making as a home industry, but such industry is subsiding. Nominal hazards only exist in modern glove making. A classification of jobs with their chief health and accident hazards is detailed.—Retail Credit Company, Atlanta, Georgia, *Indust. Rep.*, 6, 10: 111–124, illus. (Oct.), 1931.

E. R. H.

**Quantitative Measurements of the Inhalation, Retention and Exhalation of Dusts and Fumes by Man: II. Concentrations Below 50 Milligrams per Cubic Meter—**In 1928 Drinker, Thomson and Finn reported a series of studies on the inhalation and retention of dusts and fumes of a concentration of from 50 to 450 mg. per cu. m. The present study was designed for the purpose of making similar determinations at concentrations less than 50 mg.

Briefly, the dust or fume was set up in an airtight chamber from which it was delivered by the subject's inhalation through a face mask, while the exhaled air was passed through an electric precipitator, thence to a spirometer for volume measurement. The dusts used were magnesium oxide and calcium carbonate. In all 422 experiments were conducted on 32 subjects breathing normally while at rest; mouth breathing while at rest; breathing normally during exercise; and during the inhalation of approximately 5 per cent carbon dioxide.

The authors conclude "the percentage of magnesium oxide retained during normal breathing while at rest varied from about 60 per cent at a concentration of 10 mg. per cu. m. to 45 per cent at 50 mg. per cu. m. The percentage of calcium carbonate retained under the

same breathing conditions varied from about 80 per cent at 10 mg. per cu. m. to 70 per cent at 50 mg. per cu. m.

The percentage retention for mouth breathing while at rest and for normal breathing during exercise and during carbon dioxide inhalation was about 10 per cent less than for normal breathing while at rest under the same conditions.

The percentage retention changed but little at concentrations above 50 mg. per cu. m., but apparently rapidly approached 100 per cent as the concentrations fell below 10 mg. per cu. m.—Carleton E. Brown, *J. Indust. Hyg.*, 13, 8: 285-291 (Oct.), 1931. L. G.

### Studies in Dust Retention: III. Factors Involved in the Retention of Inhaled Dusts and Fumes by Man

—In the previous study of this series it was found that the percentage retention of magnesium oxide and calcium carbonate dusts presented considerable variation, and the present study of the previous data was undertaken in an effort to determine the cause for these differences. In the present analysis the number of respirations, volume of respiration, minute-volume and vital capacity were analyzed, as well as the physical properties of the inspired dust and air, including particulate size and "wetability," and the relative humidity of the inspired air. Most of the author's summary follows:

1. Percentage retention is inversely proportional to respiration rate for rates below 20 per minute. An increase above 20 per minute is apparently followed by no change in percentage retention.

2. Percentage retention is inversely proportional to minute-volume of air breathed. This effect probably results from the increase in respiration rate with minute-volume.

3. Percentage retention is directly proportional to particulate size (not particle size) and to density of dust suspended in air.

4. Percentage retention is directly proportional to extent to which the dust is wetted in passing through water.

The results also show that percentage retention apparently is not affected by the following factors:

1. Volume per respiration.
2. Vital capacity.
3. Relative humidity of inspired air.

—Carleton E. Brown, *J. Indust. Hyg.*, 13, 9: 293-313 (Nov.), 1931. L. G.

**Injuries Produced in the Organism by the Discharge from an Impulse Generator**—The authors of this paper have set out to determine whether there is danger to life associated with the discharge of the impulse generator producing a current with a crest value of approximately 100 amperes at a maximum of 20,000 volts. Etherized rats were used as the experimental animal and in all 36 experiments were conducted. It was found that when the animals were placed on a grounded copper plate and the current was permitted to enter through the head, through the center of the back at the level of the scapulae or through the lumbar region, little or no damage was produced by the electric surge. In general it was found that when the surge was permitted to traverse the length of the animal, the heart continued to beat for but a short time or ceased beating immediately upon application of the current. Where the current entered in the skin of the dorsal midline of the mid thoracic region and traversed the animal to the tip of its tail, 3 rats survived and 1 died after breathing spontaneously for a few minutes. Similarly when the current entered one of the fore limbs and traversed the length of the body the heart, in most cases, continued to beat, although one of the animals died while others recovered.

It is concluded that the greater the portion of the body that is included in the path of the current, the greater the damage to the organism, and further

this damage is increased the greater the length of nervous tissue traversed by the discharge.

The present contribution, while brief, contains many statements which are not included in this abstract. Those particularly interested in the subject of electrical injuries are urged to refer to the original.—Orthello R. Langworthy and William B. Kouwenhoven, *J. Indust. Hyg.*, 13, 9: 326-330 (Nov.), 1931.

L. G.

#### Warning Agents for Fuel Gases—

This bulletin presents the results of work done under a coöperative agreement between the U. S. Bureau of Mines and the American Gas Association. A copy of the agreement is included in the foreword, as well as the list of the gas companies and technical advisers concerned with the study.

After a discussion of the previous uses or suggested uses of warning agents, both in Europe and America, the types of these agents in respect to certain properties and a list of 93 compounds representing 36 different types were considered in the present investigation, carried on during the period of 1926-1930. Certain groups of substances were discarded immediately on the basis of such factors as toxicity, corrosion, or lack of stability. The intensity of the odor or irritating properties was measured for 57 substances which were thought to include the most promising agents. Eventually these were narrowed down to a few which appeared the most practical.

Neither pleasant nor unpleasant odors were found effective in waking persons unless present in very high and impractical concentrations. Eye, nose, and throat irritants were effective in practical concentrations. Most halogen-bearing compounds would appear unsuited because of corrosion of appliance parts, utensils, and household furnishings.

Ethyl mercaptan was found to be the most promising warning agent of the unpleasant odor type. While it is very effective in attracting attention and, when installed in city gas mains, was the cause of more complaints of leaks than any other material used in field tests, it was not found capable of awakening sleeping persons. Its very cheap cost was, however, a chief item in its favor. Amylene possesses an odor similar to manufactured gas and is rapidly transmitted to all places in the distribution system, but is not a commodity of commerce at present although it is estimated that its cost could be made similar to that of ethyl mercaptan. In fact, butylene, amylene, and Pintsch-gas condensate were transmitted through the distribution system very much more rapidly than the other substances tested.

Full scale and longer field tests in a number of different distribution systems are needed to procure the final answer for many different gas-service conditions that prevail in practice. In fact, final conclusions can only be made after practical trials are made in the industry over an extended period of years.

Crotonaldehyde was found to be second to ethyl mercaptan as the most effective compound for causing complaints of leaks in the field tests made. In these field tests, two cities having a population of 4,000 and 30,000 were used. The odorizing of natural gas with ethyl mercaptan was found not only to be practical for detecting certain types of leaks but much cheaper than usual inspection methods.

Odors are most valuable in giving immediate evidence of a contaminated atmosphere on entering a given premise, but nasal fatigue and temporary impairment or a loss of sense perception occurs rapidly. With irritants there is a lag in the sense perception which increases with the period of exposure; hence these are more satisfactory to indicate a gradual increase from low con-

centrations. For equal intensities, unpleasant odors were found to be far more effective than pleasant odors. Nose and throat irritants, including sternutators or "sneeze gases," were found in laboratory tests to be very effective in waking sleeping persons. In the end, investigators considered the field tests made too limited in both time and scope for final conclusions.—A. C. Fieldner, R. R. Sayers, *et al.*, U. S. Bureau of Mines, *Monograph 4*, 1931, 177 pp.  
E. R. H.

**The Toxicity of Methyl Chloride for Laboratory Animals**—In this research guinea pigs were exposed to concentrations of methyl chloride in three groups, averaging 49, 77, and 140 p.p.m. of the gas. The minimal lethal concentration of this gas for 72 hours' exposure of the test animals was found to be about 75 p.p.m. All of the animals exposed at 49 p.p.m. recovered, and all of the animals exposed to the average of 140 p.p.m. died. Food in the form of carrots exposed to methyl chloride absorbed traces of this gas but subsequent feeding of the carrots failed to produce symptoms in the guinea pigs. The most constant pathological changes were changes in the lungs and the meninges.—John L. White and Paul P. Somers, *J. Indust. Hyg.*, 13, 8: 273-275 (Oct.), 1931.  
L. G.

**The Rôle of Punctate Basophilia in the Control of Industrial Plumbism**—As a result of this study con-

ducted among workers in the electric accumulator trade the authors conclude that punctate basophilia (Sellers' method of staining) is often present in normal subjects and practically always present in workers exposed to a lead hazard. The value of punctate conditions in the diagnosis of plumbism is limited, but as an aid in the prophylaxis of plumbism, such conditions are of real value.—Ronald E. Lane, M.B., *J. Indust. Hyg.*, 13, 8: 276-284 (Oct.), 1931.  
L. G.

**A New Instrument for Measuring Cooling Power: The Coolometer**—Author's summary:

The paper describes a new instrument of great sensitivity for measuring the cooling power of an environment. Its essentials are a copper spool covered with a copper shell, the spool being wound with heating coils which constitute also an electrical thermometer operating on the null principle to hold the desired temperature. The current input when the desired temperature is reached gives the rate of cooling, when combined properly with the constants of the instrument. The instrument can be operated as a reflecting or a black body, and thus can be used to study radiation. With the reflecting surface it can be used as an anemometer. Its construction is such that recording devices can be applied. It can be operated dry, or covered with a wet wick.—Walter S. Weeks, *J. Indust. Hyg.*, 13, 7: 261-265 (Sept.), 1931. E. R. H.

# CHILD HYGIENE

**D**URING 1931 we have presented in these columns, from month to month, the elements which make up a complete child health program. Beginning with maternal and early infant hygiene the program was developed, one step at a time, until the child was well established in school life.

The reports from various committees of the White House Conference on Child Health and Protection have begun to appear and promise an encyclopedic array of material on every phase of child life. Now that this wealth of material is available, let us turn our attention to the actual developments.

This year we propose to address ourselves to the presentation of practical child health projects and organizations as they are actually set up and functioning in different parts of the country. It is hoped that members of the Association will send to the editor reports, organization plans, and current material relating to child hygiene in their communities.

We have just received a splendid report of the opening of a unique public school, in Battle Creek, Michigan, which aims to meet the needs—physical, mental and social—of all types of children. This is the Ann J. Kellogg School, made possible by a magnificent gift from W. K. Kellogg in memory of his mother, for whom the school is named.

The Battle Creek Public School Department has issued a bulletin concerning this school from which the following material is taken:

## FACTS ABOUT THE ANN J. KELLOGG SCHOOL

Battle Creek, Michigan

### *I. Purpose*

1. The purpose of the Ann J. Kellogg School is to bring equal opportunity to all

types of pupils for the development of those individual abilities which will enable each to meet most effectively the obligations of life.

2. The school was built in memory of the mother of W. K. Kellogg, whose proffer of a gift to the Battle Creek Public Schools made possible this institution. The building is pleasantly situated on a shaded residential street within a stone's throw of Ann J. Kellogg's first home in Battle Creek.

### *II. Building*

1. The building was especially designed for special education at a cost of one-half million dollars for site and structure.

2. Its dimensions are 318 ft. long x 190 ft. deep and is constructed in the shape of a capital "E."

3. The graceful lines, slate roof, and Indiana cut limestone front lend to its beauty and dignity.

4. All rooms are excellently lighted both with natural and artificial light.

5. The cafeteria is fully equipped for modern cooking.

6. There is an attractive library for all pupils of the school.

7. Eight class rooms for the lower grades are equipped with auxiliary industrial art shops.

8. The health suite consists of examining rooms, dental room, and office.

9. The model rooms for kindergarten and first grade pupils appeal to adults and children alike. Built between two class rooms, and with entrances from either, is a miniature house. The lower floor is an industrial arts shop and wardrobe, and contains a drinking fountain, lavatory, and toilets. The second floor is partitioned into two play rooms. Viewed from one class room this house presents an Old English front decorated with "Gingerbread," while from the other class room it has the front of a French house. A second equally beautiful and similar suite has a Spanish house on one side and a Colonial on the other.

10. The general shop for finding and exploratory courses is equipped for woodworking, mechanical drawing, clay modeling and firing, sheet metal work, electricity, household mechanics, and printing.

11. The gymnasium is spacious and well equipped.

### *III. Scope of Program*

1. The school is divided into three departments. Two of these, the elementary and

junior high, were organized for normal children and include the greater percentage of the pupils enrolled. The third is a department of special education.

2. The school's program and its objectives are inclusive of the ideals set forth in the recent White House Conference on Child Health and Protection. Organized around and coördinated with the two departments for normal children is a department of special education designed to provide for all types of atypical children. This organization was developed to make an analysis of the mental, physical, and emotional status of the children, to eliminate or minimize their handicaps in so far as possible, and to assist them in the discovery of their respective interests and aptitudes.

#### *IV. Special Rooms*

1. Adjusted program classes are provided for those pupils who experience difficulty with the academic phases of the regular class work. Special attempt is made to discover their outstanding aptitudes and abilities. The curriculum is not merely an abbreviated form of that used for the rest of the school, but is definitely selected on the basis of its present and future value in the lives of these boys and girls.

2. Home environment and physical health of children are important factors in their mental health and consequent social adaptability. Pupils who are unable to adjust themselves to life in a sufficiently satisfactory manner are placed in social adjustment classes. The program is designed to correct the maladjustment and to get them back into the normal groups as quickly as possible. The value of the work is demonstrated in the finer qualities of citizenship acquired by these pupils.

3. The lowered vitality group are placed in open air classes. Anemic, underweight, and malnourished children form a large percentage of the enrollment. They are provided with rest, milk, cod liver oil, "sunshine" treatments, and suitable physical exercise. They work and rest in rooms that are always kept as nearly as possible at a temperature of 69°.

4. The orthopedic section of the special education department is the most extensive of any on account of the equipment and personnel required for its administration. The hydrotherapy room is equipped for warm water treatments, and whirl pool and brine bath. The warm water pool is kept at 95° Fahrenheit and is used for the reëducation of paralyzed muscle. The buoyancy of the water supports the child sufficiently to make exercise much easier, and the heat stimulates

circulation and assists in relaxation. The use of the whirl pools is equivalent in effect to a general massage.

The psychology involved when children find that they can use their muscles in many ways that are new to them plays an important part in their progress.

5. Special lamps and bakers are used in the physiotherapy room for reëducation of muscles by heat and massage.

The physical therapy room is equipped with such apparatus as a punching bag, stall bars, spastic ladder, and mats. The room is used for corrective physical exercises.

6. The work in occupational therapy supplements that in physical therapy. The purpose is to provide therapeutic exercises that will be interesting and creative as well as remedial. It includes units in such work as sewing, weaving, cooking, clay modeling, typing, printing, wood work, and basketry.

7. Sunshine baths are furnished in a well equipped solarium. Reclining cots are arranged in a circle below the source of light. The light is radiated from four special carbon arcs suspended from the ceiling.

8. Proper eye hygiene and conservation of sight are the objectives of the sight-saving classes. Equipment used for this sort of work includes heavily outlined maps, 24 point text books, and special desks. To eliminate glare, the blackboard is tilted and the desks are of dull finish. No pictures nor anything including detail or likely to cause eye strain is used. Blind children and those whose vision is becoming worse, such as progressive myopia cases, will be taught to read braille.

9. Children who are so deaf that they are handicapped in attempting to carry on ordinary conversations are taught speech reading, or visual hearing. Congenitally deaf children are, of course, taught to do the same and also to speak. Moving pictures and other special equipment are used to develop in them the ability to use properly the various organs of speech and produce sounds which they themselves have never heard.

10. Speech correction classes have been included for those with such defects as lisping, stuttering, stammering, and cleft palate.

11. Specially gifted children often find the ordinary school work very monotonous. As a rule, these pupils are capable of carrying a greatly enriched program with no more effort than is required of the ordinary child to do the work of the regular grades. Organized into major work groups these pupils can learn to do dramatic work in foreign languages, creative work in music and art, and elementary experiments in science at very early grade levels. They also learn to assume



an initiative and responsibility that are compatible with their natural endowments.

12. There has been formed a special reading group for those pupils who experience severe difficulties in reading, but whose abilities are not otherwise retarded. This work involves diagnoses of the particular difficulties and private tutoring and drill to overcome them.

#### W. K. KELLOGG FOUNDATION

"The permanent headquarters of the W. K. Kellogg Foundation, which Mr. Kellogg launched with a large sum of money, are located in Battle Creek.

"The purposes of the Foundation are directly or indirectly to become actively engaged in child welfare, to consider ways and means of helping in matters of child health, education, recreation, character building, and to influence school children so that health education may in turn penetrate the school, the home, and the community.

"The Foundation's activities are not limited to any country, race, creed, or religion, or are they to be confined within any geographical boundaries.

"At the present time the Foundation is intensely interested in the problem of the rural school. It is encouraging the consolidation of small country school districts and the establishment of central schools to include all classes and grades up to university entrance, where vocational training and health courses may be added to the curriculum so that the rural school child may have equal, if not greater, opportunity than the urban child.

"Another of the projects of the Foundation is to sponsor the physical and mental health programs in the Ann J. Kellogg School.

"The work of the Foundation is not only carried on in close coöperation with the local medical profession, but as far as possible the services of local physicians are utilized.

"The medical work at the Ann J. Kellogg School is under the supervision of an Advisory Board representing the W.

K. Kellogg Foundation and the Board of Education. The members of the Advisory Board consist of:

Health Officer of the City of Battle Creek  
(Chairman)

President of the Calhoun County Medical Society

School Physician

General Chairman of Consulting Physicians  
whose services are used in the health program

Medical Director of the W. K. Kellogg Foundation

Local Representative of Crippled Children's Committee

Superintendent of the Battle Creek Public Schools

Principal of the Ann J. Kellogg School

#### PERSONNEL OF ANN J. KELLOGG SCHOOL

##### *Administrative Staff*

Principal

\* Director of Pupil Placement

\* Director of Health

##### *Teachers*

Elementary Department

Junior High Department

Special Education Department

Special Subjects

##### *Special Personnel*

Dentists

Visiting Teacher Nurse

Nurse

Physiotherapists

Occupational Therapist

Clerks

Dietitian

Librarian

Attendants

Bus Drivers

##### *Maintenance*

Engineer

Fireman

Janitors

##### *Superintendent's Staff Giving Part Time Assistance*

Director of Special Education

School Physician

Supervisors of Elementary Grades

Supervisor of Vocational Education

Supervisors of Industrial and Fine Arts

Supervisors of Music

Directors of Physical Education

*Consultants and Directors of Clinics*

This includes more than twenty specialists, representing local and state medical and dental organizations."

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\* Furnished by the W. K. Kellogg Foundation.

# PUBLIC HEALTH NURSING\*

**When Nurses Speak in Public—**  
Nurses need to realize that to be successful in public speaking they must be heard; otherwise the morale of their audience gradually wanes. Inability to be heard and lack of spontaneity often go together, and this is fatal.

Nowadays when a nurse is on some big program to speak she is requested to have her paper completed by a given date and forwarded to the committee. Busy as she is, with an intense effort she hurriedly completes it and sends it in, thankful that it is done. It would be better if she were allowed to send in a brief outline of her paper 3 months ahead, as an address should grow like Topsy; the ideas in it should expand and change as time and thought are spent on them. It pays to live intimately with one's subject, and a busy nurse has time to do this, dressing and undressing, waiting for a bus, going down town, or taking a walk. If the subject is allowed to ferment in the back of the mind often the stream of expression can scarcely be restrained. This is better than to sit at her desk and "torture her arid thoughts into a definite channel."

The chief objection to many papers read at nurses' meetings is that they do not arouse interest, stimulate curiosity, or make one think—they are not alive enough to make a dent in the placid surface of any mind.

Nurses are too afraid of changing their minds or expressing thoughts which are not in agreement with the conclusions of others, though they should know that change is essential to all growth.

After the outline of a paper there should be a rough draft to be analyzed as follows:

1. Is what has been written based on sufficient knowledge and study?
2. Is it honest in purpose and expression?
3. Is it animated by a desire to please or to conform to the opinion of others?
4. Does it express the meaning of its author?
5. Does it serve any useful purpose?—Is it helpful, instructive, stimulating, amusing, or interesting?

It helps a beginner to concentrate on arousing the interest of a bored looking person sitting on a back row directly in front of her. Some like to pick out a face showing kindly interest for the inspiration it gives.

It is a good thing for a nurse to be nervous for fear her address will be a failure. Complacency and assurance are not assets at all.—Mary E. Gladwin, R.N., *Speaking in Public*, *Am. J. Nurs.*, XXXI, 10: 1147-1152 (Oct.), 1931.

**Nursing Problems Are World-Wide—**There is a critical situation in nursing in the United States, in England, and in the Union of South Africa, but the situations are somewhat different. In England provincial hospitals are finding a shortage of properly qualified nurses to staff them; in the United States there is a great oversupply of nurses, many of them poorly qualified, while there are not enough well qualified public health nurses and instructors in nursing schools to go around; in the Union of South Africa there are not enough nursing schools to train an adequate supply of nurses.

Perhaps there is an underlying reason for these present acute nursing situations. In the 80's and 90's there were

\*The material is not to be used for other material to be published in the *Journal of Public Health Nursing*, L. F. Mac-  
Lennan, Editor, 1111 North Dearborn, Indianapolis, Ind.

few opportunities for young women of good cultural and social background and the new profession of nursing offered emotional satisfaction, opportunity for development and economic independence. Later hospitals increased and enlarged enormously and at the same time many other professions were opened to women. Hospitals continued to depend upon student nurses and continued the old militaristic system which served its purpose well when it was first laid down by Florence Nightingale.

An "Outsider," in the *Nursing Times* for October 17, says:

At one time the nurses of the day were as a rule nuns, and these nuns in mediaeval times were quite willing to submit to the rigorous discipline imposed on them. They had taken vows by which they had renounced all worldly things, but those same vows are not required from nurses today and yet in many cases the same discipline prevails.

If one compares the lives of two 18-year old girls, one training for the teaching profession, the other for the nursing profession, he soon realizes some of the reasons why the better type girl would rather choose teaching. She has the time of her life in college; she works hard but she has her own latch key, uses the telephone whenever she likes, and takes part in student social activities. She has freedom to develop individuality. In the nursing school, as an "Outsider" expresses it, she "is expected to renounce her own individuality for the next few years and become a little machine, efficient, but devoid of feeling except where it concerns her patients."

An "Outsider" also says:

There is probably no greater autocrat in the world than a hospital matron. She may not be outstanding in personality, education or social standing, but she can entirely forget the fact that she was once a probationer, and stand on a pedestal to which the whole nursing staff must look for several years.

Mary M. Roberts, editor of the *American Journal of Nursing*, in a let-

ter to the *Nursing Times* of the same issue, says modern young women of high type in England and United States are not devoid of the spirit of service. Many able and educated women can be and are interested in the nursing profession, but they are not living in the Victorian era, so they want, as do all modern young women,

Reasonable hours  
Adequate income  
Constructive leadership  
Opportunity for growth

We are quoting Miss Roberts as to the solution of the nursing situation:

When schools of nursing are organized and supported as other professional schools are now supported—by taxation or philanthropy—when student nurses pay tuition (part of this might well be remitted for service rendered), when hospitals have hours of service comparable to the hours of work of other young women of good intelligence, education and social background, we shall have gone a long way toward solving the problem of securing adequate, intelligent and sympathetic nursing service for our patients.

#### REFERENCES

- An Outsider. The Shortage of Nurses, *Nursing Times*, 1381: 1118 (Oct. 17), 1931.  
Roberts, Mary M. American Views on the Shortage of Nurses, *Nursing Times*, 1381: 1120-1123 (Oct. 17), 1931.  
Serious Shortage of Nurses, *South African Nursing Record*, XVIII, 9: 245 (June), 1931.

About Public Health Nursing Associations in Connecticut—The Bureau of Public Health Nursing of the Connecticut State Department of Health has recently made a study of 83 public health nursing associations in Connecticut. The following are some of the data found under the headings of the different services included in the program:

#### 1. Maternity

All associations give some prenatal care. In 5 associations, urinalysis and blood pressure readings are routinely made at the time of the visits. In 4 associations, urinalyses only are done.

#### Delivery Service

48 give this service

- 14 give the service only in emergency  
21 do not give the service at all
2. *Tuberculosis*  
There are only 2 associations in the state which do not include tuberculosis nursing as part of the generalized program. This is explained by the fact that there are special facilities in these towns for the care of such cases.
3. *School*  
Of 93 generalized associations in the state, 50 include school nursing in the program and 43 do not. School nursing is a specialized activity in 38 of these 43 associations, 16 being in large cities and the remaining 22 in towns ranging in population from 1,880 to 18,740.
4. *Hourly Nursing*  
There are 16 associations giving hourly service.
5. *Clinics held (Continuously)*—
- |                    |                    |
|--------------------|--------------------|
| Dental             | by 25 associations |
| Mental             | by 5 "             |
| Tuberculosis       | by 9 "             |
| Prenatal           | by 5 "             |
| Immunization—      |                    |
| Diphtheria         | by 2 "             |
| Eye Clinics        | by 1 "             |
| Tonsil and Adenoid | by 1 "             |
6. *Conferences:*  
Child Hygiene by 62 associations
7. *Clubs and Classes:*
- |                     |                        |
|---------------------|------------------------|
| Mothers' Clubs      | held by 8 associations |
| First Aid Classes   | " " 23 "               |
| Home Hygiene and    |                        |
| Care of the Sick    | " " 13 "               |
| Posture Classes     | " " 4 "                |
| Summer Camps        | " " 1 "                |
| Social Service Com- |                        |
| mittees on Board    | " " 9 "                |
- (This information was obtained several months ago and is probably less than the number at the present time.)
8. *Charges made for services:*  
Charges vary from \$.50 to \$1.25.  
6 associations charge \$.50.  
20 charge \$.75.  
\$1.00 is the most common fee asked.
9. *Cost of nursing visit:*  
The cost varies from \$.75 to \$2.80, the high cost indicating fewer nursing visits and more health education activities, social work and clinic services. The average cost is between \$1.00 and \$1.50.—
- Information on Local Services, *Pub. Health Nurs. Bull.*, Connecticut State Department of Health: 5-6 (Nov.), 1931.

## EDUCATION AND PUBLICITY\*

WHEN communities come to learn the fact, which is a fact, that a large proportion of the ills of mankind are in their nature preventable, and by due observance of hygienic laws may be prevented; then will the responsibilities of "Boards of Health" be fully appreciated, their acts sustained by public approval, and the fullest practical advantages flow from them.

When the public come to comprehend our true official character, as in time they will, we shall be expected not only to supervise, and, when possible, direct in matters affecting public health, but also to become a source of information in regard to everything connected with the physical well-being of our fellow citizens.—Dr. C. A. Lindsley in his first report as Health Officer in New Haven—a half century ago (1881).

**Education Versus Service**—A comparison of smallpox and diphtheria vaccinations obtained by service of school physicians in the schools of Cleveland, and by education of parents as practised in Detroit, is reported in a brief paper by O. P. Kimball, M.D., Board of Education, Cleveland.

Dr. Kimball concludes that—

As much or more is being accomplished in Detroit than in Cleveland. True, the school physicians themselves are not doing the work, but the parents are having it done. The school physician, nurses and teachers have been teaching health at every school contact to the effect that pupils and parents are gradually accepting the principle that this important business of future health is their responsibility; and because of this, more work is actually being done.

This comparative study was not made with the idea of criticizing the medical work in any school system. It was made solely for the purpose of estimating the results in terms of preventive medicine, of two totally different systems: Health education and medical welfare as school services.

I feel sure that any community will respond to the principles of health education as

Detroit has done. And, what seems very important, the parents and pupils will have the knowledge and experience of taking care of themselves. Also, in so doing they maintain a greater self respect.

The school nurse of the future will be a teacher of health. Instead of dragging a group of children in to have their teeth cleaned and a few extracted she will be teaching them how to keep their teeth clean and how to make use of the facilities which the community offers. Instead of spending twenty minutes scrubbing and cleaning a dirty little face with impetiginous infection, she will do the bigger and better job of taking the child home and teaching mother and child what they should do about this condition.—

*Health Education in Two Cities. Pub. Health Nurs., 450 7th Ave., New York, Nov., 1931. 25 cents.*

**Three Thanksgiving Days**—Dr. John L. Rice presented to New Haven the "makings" of a notable Thanksgiving Day celebration. The November, 1931, issue of *Health*, New Haven Department of Health, was a comparative study of health conditions in that city in 1881, 1931 and 1981. The cover page carried "Thanksgiving" and the

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

three dates. A group of mortality figures for 1881 were contrasted with those of 1931—with blank spaces for 1981.

A page of short paragraphs on conditions in 1881 was set off by similar paragraphs concerning 1931. Dr. Howard W. Haggard compares 50 years ago with the present, and Prof. C.-E. A. Winslow pictures 50 years hence.

Plenty of white space. No diagrams or illustrations. Several silhouettes might have enlivened the pages, and would go well with the paper.

A good form of comparative reporting for other city departments—at any time of the year. *Sample free to any health officer.*

**1932 Awards of Merit**—Health materials for publicity, interpretation, or health education, whichever it is or whatever you call it, will be considered by the Awards Committee of the Social Work Publicity Council.

Press stories, photographs, posters, letters, all types of printed matter, mimeographed matter, annual reports, slides, film strips, photographs and descriptions of exhibits or activities, or what?

Send to the editor of "Education and Publicity," to address on the first page of this department every month.

There will be no prizes, but the features of significance will be selected and announced in May, 1932. Send entries now, and more later.

**Digging into the Past**—Elsewhere in this issue is recorded health wisdom dug up by New Haven.

In New Jersey's *Public Health News* is told how "Morristown Citizens Were Given Sound Advice 55 Years Ago" (State Dept. of Health. Sept.-Oct., 1931).

According to a Racine newspaper,

Twenty years ago, the Health Department referred to the press a story about 17 cases of diphtheria occurring in the month of Oc-

tober and added the comment that no epidemic was threatened. At that time, the official population of Racine was 38,000.

The coincidence comes in the fact that the first 10 months of 1931 have witnessed the occurrence of 17 cases of diphtheria in Racine, which is exactly the same number as those reported in 1 month 20 years ago. Moreover, the population is now 68,000, thus making the ratio practically 19 to 1.

Departmental reports and files, and local newspapers in other communities may yield statements, incidents or facts, interesting and stimulating in the present day.

**The Advertiser and the Schools**—The organizations seeking wider educational use of broadcasting are stimulating much discussion of the "sponsored program" in relation to the classroom. One center for this discussion is the National Committee on Education by Radio, 1201 16th St., N. W., Washington, which issues a semi-monthly *Education By Radio*. Copies free. In "Advertising Invades the Schools" (Sept. 10, 1931) is the following taken from the 1931 report of the California Commission for the Study of Educational Problems:

Radio advertising invades schools—It has always been a fundamental principle of American education that the schools must protect their children from exploitation; that no interest shall be permitted directly or indirectly to advertise in the classroom. The commission regrets to report that this principle is being flagrantly violated in many California schools and that the regular work of the children is being interrupted, largely because modern methods of advertising have insinuated themselves into the school system.

By donating to the public schools fine radio and motion picture programs, and cleverly enlisting support therefor from teachers, parents, and school officials, a number of California business firms today are inducing the schools to grant them advertising time in the school-room. The commission is unable to see any practical difference between printing the words "Brown and Company are good merchants" on the blackboard and permitting the words "Brown and Company are making you chil-

dren a present of this fine program" to be spoken repeatedly in the classroom or to be flashed upon a motion picture screen.

The admission into the schoolroom during school hours of radio and film programs carrying "good will" publicity establishes precedents which naturally lead other firms to try to gain admission for their own advertising. Granting one firm such a privilege while denying it to others confers an unfair trade advantage.

An interesting example is a well printed 6-page folder on Foods For Growing Boys and Girls issued by a state tuberculosis association. At the foot of the last page appears "Courtesy of . . .," naming a food manufacturer. Not a line in the text emphasizes the uses of cereals or otherwise promotes that food business. The "food chart" gives less space to cereals than to fruits and vegetables. It does include some of the trade names for cereals. Send 2 cents to Michigan Tuberculosis Association, Lansing, if a copy is desired.

Recently among the free material displayed by one of the most influential health agencies in New York was a folder containing a recommendation disapproved by the great body of health workers.

*What precautions should be taken?*

*What lines should be drawn?*

*What encouragement should be given to commercial interests?*

**Trouble News Invited**—"Troubles," problems, unsolved questions as to the future development of health education—whatever you have on your mind—may well be told to Chairman Galdston or any member of the Section Council. Early in January the usual mid-year meeting of the Council will be held to plan the 1932 program. Suggestions from the floor will be most welcome.

**High Tide at Montreal**—The attendance of those concerned with health education, the nature of the program,

the use made of education and publicity headquarters, and the intensity of interest in the development of health education and the functioning of the Section made a most gratifying combination.

We look forward to an even better time at Washington in 1932.

**Selecting Topics for a Conference or Convention**—An outline on this subject has been prepared for discussion by program committees who wish to study the theory and technic of making up successful programs. The outline is also being used by some program committees as a check against the plans they are making. *Copies free* from editor of this department.

**Convincingly But Not Positively**—F. P. A., in *New York Herald-Tribune*, unconsciously pictures a frequent difficulty of writers on health subjects:

Most of us were told that Mr. William Gillette's 1929 appearances as Sherlock Holmes constituted his farewell tour. And now, the day after Christmas, he will begin a farewell tour. And that, gentlemen, reminds us of the fellow who crashed the No Admittance sign. "Hey, what's the idea? Can't you read?" "Sure, but it don't say 'Positively.'"

The difficult art of being convincing when we cannot be as positive as, say, the patent medicine men!

**The Doctors Do It**—The official health examination campaign of Greater New York physicians is on a sound continuing basis.

The health examination idea is, as every physician knows, nothing peculiarly new. Fifty years ago the subject was proposed to organized medicine through resolutions at medical society meetings. Ten years ago the Committee on Public Health of the Medical Society of the County of Kings discussed the matter and in 1925 examined 91 of the members of the society. In 1926 the committee issued a Report of its experiences and Chapter V of that report was entitled "Records, Equipment and Follow-up." *The Health Examiner* in the present issue reprints this

chapter which reflects the consensus of opinion of the group examined and the examiners.

The above is from *The Medical Examiner*, the 24-page, miniature magazine, issued by The Greater New York Committee on Health Examination, 2 East 103d St., New York. 10 cents; \$1.00 a year.

The committee has issued a new leaflet to be placed on waiting room tables for patients to read and take with them. Cards with the following copy, in script type, have been issued.

In the interest of continued good health you are urged to visit your physician for a health examination at regular intervals.

This measure of preventive medicine and personal health service is endorsed by the Five County Medical Societies of New York and the New York Academy of Medicine.

Engraved cards are supplied at 2 cents each; printed cards and leaflets are free—in Greater New York. *Samples free.*

**Neither Distinction Nor Difference**—Probably the health worker who issued the statement below used the words we have italicized only to emphasize the significance of the exhibit, and did not mean to imply a distinction between "impressing the public mind" and doing an "educational" job.

It is not only for the purpose of *impressing the public mind* with the menace to health of impure air and dirty streets that an exhibit will be held . . . but it is being arranged primarily as an *educational measure* to stress the possibility of preventing this nuisance as well as health hazard.

**Is Mental Hygiene Oversold?**—When the public wants something as badly as it seems to want mental hygiene, it is probably going to get it in some form or other. The task of the organized mental hygiene movement is to look that fact in the face and to deal

with it as best it can," says Stanley P. Davies in "The Public Mind on the Private Mind." This is the sub-title of "Education of the Public on Mental Hygiene," a paper presented before the Educational Publicity Division, National Conference of Social Work.

The paper reviews the comments of psychiatrists and others that mental hygiene has been oversold. They believe that a demand has been created out of all proportion to the extent to which it is possible to deliver the services of properly trained psychiatrists, of psychologists and psychiatric social workers of clinics and other services.

Those who believe that mental hygiene is oversold in this sense fear that the creation of a demand, before proper facilities exist to meet that demand, invites not only the development of misguided, half baked even though well intentioned, ventures in mental hygiene, but also opens a wide field for quacks and charlatans who are only too ready to exploit all possibilities. Such a situation as they see might be compared to the widespread national advertising of a highly desirable commodity, the production of which is, however, so limited that the genuine article is on sale in very few places, and with people elsewhere so convinced, through effective advertising of their great need of that commodity, that they are being sold inferior substitutes or entirely spurious articles.

After reviewing thoughtfully both sides of this program of over selling service Mr. Davies nevertheless comes to the conclusion:

The field of greatest opportunity for educational and publicity work in mental hygiene lies wide open. Mental hygiene, real mental hygiene, has not been oversold. Mental hygiene means not mental disease, but mental health. It is primarily concerned with the normal, not with the abnormal. It is, or should be, positive not negative in its approach.

Just what this positive approach would be is described and illustrated at length in a most helpful way. That editors recognize a need for this thor-



ough analysis of the problem of mental hygiene propaganda is indicated by the number of sources listed below for obtaining the paper.

In *Proceedings of National Conference of Social Work*—1931. University of Chicago Press, 5750 Ellis Ave., Chicago. \$3.00. In *Mental Hygiene*, 450 7th Ave., New York. Jan., 1932. \$1.25. Reprint, 15 cents. In brief form, "What Grown Ups Cry For." *Survey Graphic*, 112 E. 19th St., New York. Dec., 1931. 30 cents.

#### Publicity by the County Nurse—

Several publicity or interpretation items are included in a suggested program of work for the county nurse issued by the Division of Public Health Nursing, New York State Department of Health.

The nurse may expect for her committee immediately upon her arrival (among other items listed): Suitable and sufficient publicity regarding her arrival.

Here is an opportunity for the state department or the state tuberculosis association, whichever is most directly concerned, to serve both the local committee and the new nurse. The local committee may not know what to say in print when the county has a nurse for the first time, or to reexplain the service when a new nurse arrives. And what shall they say about the nurse herself? Does the state health agency supply the local committee copy to be used in the newspapers?

Where the territory covers a county or more than one community the formation of local committees will be very helpful in various ways (among others): To disseminate accurate information in the community regarding the nurse's work in general and regarding the details of new work to be developed.

But does the committee know what to "disseminate," and how? Does the nurse know?

Does the state office send to the com-

mittee or to the nurse copies of good news stories from other communities, as examples? Or offer ready-made stories now and then to be adapted locally? Or tell of reading references that will help in the job of "dissemination"?

Under "Aids in Systematizing Rural Work" are suggestions for zoning the county and making a schedule of visiting periods.

Have this schedule printed or mimeographed for distribution to doctors and supervisors, for posting in appropriate places throughout the district, and for publication in the newspapers.

For the newly trained nurse or even one of some experience, the above simple suggestion immediately raises a row of barriers to be hurdled.

What should be said in introducing and explaining the zone schedule? Does that suggestion call for one or two or three forms of the schedule for the three uses? Just how should a zone or community schedule be put down on paper in a form easy for the nurse, and practicable for use by those who are to use it?

Absurd questions? Then try it out yourself, and then imagine the newly-made county nurse who has had no experience in explaining herself and her job, and has never had mimeographing or printing done, or has never "put anything into the newspaper."

Is there any place for her to write for samples? Will the state department or state association send her a model form or specimens of what other nurses have done?

The county nurse is but one among the health workers who come up sharply against brand new chores in promotion and interpretation. What is being done to help them? What more might be done?

#### MAGAZINE ARTICLES

To be quoted; to be commended; to be questioned—if need be.

"The Airplane Germ Peril." *Literary Digest*. Nov. 4, 1931. Based on *Lancet* article.

"The By-Products of an Accident." *Literary Digest*. Nov. 28, 1931. Based on *National Safety News* article.

"The Doctor Looks at Medicine." *Nation*. Nov. 4, 1931. Cost of medical care.

"The First Fifty Years," by C. W. Lieb, M.D. *Collier's*. Dec. 12, 1931.

"Don't work too hard!"

"The Frost on the Baby Crop." *Literary Digest*. Nov. 28, 1931. Infant mortality. Based on *Good Health* article.

"Keeping Children Well in Winter," by W. R. Ramsey, M.D. *Farmer's Wife*, St. Paul. Dec., 1931.

"Noisy Ambulances." *Literary Digest*. Nov. 14, 1931. Based on *New York Times* article.

Manuscript for rural readers will be welcome to Health Editor, *Farmer's Wife*, St. Paul.

When you have a specially good press release, or article in your house organ it may get into *Literary Digest* if sent to the editor in New York City.

#### UNEMPLOYMENT

"Writer Warns of Glaring Errors in Articles for Food Pages," by L. H. Milliman. *Editor and Publisher*, Times Bldg., New York. Nov. 28, 1931. 10 cents. Detailed analysis to show "How to Live on Ten Cents a Day Features" often built on imagination and poor arithmetic.

"Emergency Nutrition," by Henry C. Sherman. *Child Health Bulletin*, 450 7th Ave., New York. Nov., 1931. Free. How to spend the food money. Economizing Safely. Leaflet by Connecticut State Dept. of Health, Hartford.

They Proved It: Dairy Products the Basis of an Adequate Economical Diet.

6 pp. National Dairy Council. Free.

The American Social Hygiene Assn., 450 7th Ave., has outlined specific needs in the social hygiene field growing out of depression conditions. Free. Also in *Bulletin*, Massachusetts Society for Social Hygiene, Little Bldg., Boston. Nov., 1931.

"Tuberculosis Is Never Unemployed." *Crusader*, Wisconsin Anti-Tuberculosis Assn., Milwaukee. Dec., 1931. Why tuberculosis work must go on.

"Dairy Products in the Adequate Low-Cost Diet." *Dairy Council Digest*, National Dairy Council, 221 N. LaSalle St., Chicago. Nov., 1931. Free.

"The Second Winter." *Pittsburgh's Health*, Dept. of Public Health. Nov., 1931. Disease usually accompanies extreme depression; worry is dangerous; the emergency must be met.

"Stalwart Citizens" (who are in need), and "They Must Be Helped." *Health*, New Haven Dept. of Health. Oct., 1931. Appeals for Community Chest support.

Principles and policies on administration of relief are outlined by President's Organization on Unemployment Relief, 1734 New York Ave., Washington. Free.

#### NEW

*Better Times*, now published by the Welfare Council, 122 East 22d St., New York, appears in a brand new dress, about 8" by 11" in size. Weekly bulletin issues; 4 magazine issues a year. For those who wish news of health and welfare activities in New York City. Samples free.

*White House Conference Happenings*, Interior Bldg., Washington. Free. Follow-up activities; "scope and status of publications"—past and to come.

The Provincial Dept. of Health, British Columbia, started a *Health Bulletin* in September.

## BOOKS AND REPORTS

**The Great Physician. A Short Life of Sir William Osler—***By Edith Gettings Reid. New York: Oxford University Press, 1931. Price, \$3.50.*

This is the story of a man rather than a physician. We meet the man, but are told about the physician. The book is one long eulogium. In that sense it is extremely discouraging to mere mortals. Had Dr. Osler been permitted the luxury of a single weakness, or had not some of what may have been weaknesses been rationalized into nobilities, the book would be more of an inspiration. In speaking of Dr. Osler's numerous biographical essays the writer remarks:

His essays are not characterizations; they are idealizations of what was best in his subject, of what the man might be, not exactly what he was. . . . You are left with a somewhat exaggerated idea of the virtues of his subject.

Can the author of the present work then be censured for following in this respect the example of one for whom she has such obvious admiration?

Regardless of any one-sidedness it may have, the book makes extremely interesting reading. There is a vividness of presentation which is remarkable, though the degree is not uniform. We meet Dr. Osler at his table; we romp with him in the nursery; we enthuse with him over a rare edition added to the library; we accompany him to the sick room; but, while we may look into his laboratory or his clinic, we do it as through a glass door. We are informed that he is busy. We may even enjoy the courtesy of being informed as to what he is doing, but to get back into personal contact, to renew the bonds

of fellowship, we must wait and rejoin him as he emerges.

This work will doubtless delight the many friends of Dr. Osler in this country and abroad. Few men had the gift of making friends to the extent possessed by him. A vast number of younger men cherish the remembrance of his geniality and aid.

The book is beautifully printed.

MAZÛCK P. RAVENEL

**School Ventilation—Principles and Practices—***Final Contribution of the New York Commission on Ventilation, New York: Bureau of Publications, Teacher's College, Columbia University, 1931. 67 pp. Price, \$1.00.*

The appearance of this "final contribution" presumably marks the end of the reincarnated New York Commission on Ventilation, which engaged in studies of the effects of various types of school ventilation, from 1926 to 1929. This report is certainly not the "final" word on this much discussed and highly controversial subject and as a "contribution," it can be judged only from the standpoint of its value in clearing away certain earlier errors and misconceptions concerning both the principles and the practices of school ventilation.

Both the proponents and the adversaries of the commission will be interested to learn that its members now admit, as a result of the recent studies, that ". . . the general uniformity of results, with varying air flow and with unit ventilation and window inlets, raises serious doubts as to the earlier conclusions obtained (sic) by us in 1923. . . ." In our own earlier work ". . . the superiority of window gravity

*ventilation was based on differences in respiratory illness in attendance obtained by methods which we now know were inadequately safeguarded."* Of equal interest will be the statement that "... slight differences in room temperature, deviating only 2° or 3° above or below 70°, do not exert a measurable influence upon the respiratory disease incidence. This contradicts our own earlier conclusions . . ." (p. 41).

And of the utmost importance is the admission of the fact that "*Our earlier view that window gravity ventilation is definitely superior to plenum ventilation from the standpoint of the liability to respiratory infections must apparently be abandoned . . .*" (p. 48). (Italics T. J. D.)

Furthermore, there is absolutely nothing in the text to justify the implication on the paper jacket of the book, and the definite statement in the newspaper release that announced its publication, that systems of mechanical ventilation are *per se* a menace to the health of the pupils. In fact, on page 41, it is stated that "it makes no difference to the health of the pupils . . . whether this air is provided by a plenum fan, a unit ventilator, or a window inlet" and, on page 66, we are told that "Desirable air conditions may be obtained . . . (a) by plenum ventilation; (b) by local unit ventilation; (c) by window-gravity ventilation," while on page 54, fan ventilation is even recommended "In certain schools where outdoor noise or dust or odors may make it inadvisable to keep the windows open. . . ."

The above statements indicate what scientific investigation actually reveals, namely, that there is nothing inherent in mechanical forms of ventilation inimical to the health of the pupils, and why the commission should, in face of these facts, label it a menace with one breath and approve or recommend it in the next is incomprehensible. It is the

condition of the air in the classroom that is important, not the means by which the condition is obtained or maintained, and it is well-known that debilitating and dangerous overheating may occur with any system of school ventilation that is not intelligently operated.

While the above confessions of error will partially purge the souls of certain members of the commission, they will no doubt cause embarrassment to certain organizations and groups which placed their respective stamps of approval on the earlier conclusions of this august body.

With so much recantation, it will, perhaps be a source of wonder that the members of the commission try still to maintain "that both respiratory-illness-absence and respiratory-illness-inattendance may be used as satisfactory and reliable measures of the health of the pupils . . ." when the absence of objective diagnostic standards for certain respiratory illnesses is so widely deplored, and when, as Greenwood has it, there is certainly no "unambiguous relation" between classroom air conditions and the so-called minor affections of the respiratory tract. The commission is in possession of facts, not published in this book, regarding the inability of various observers—teachers, nurses, and physicians—to agree on diagnoses; facts that do not lend the slightest support to this thesis.

It is also difficult to explain on any ground but bias, why this quasi-medical group, seeing all reasons therefor on the ground of healthfulness shattered, steps out of its rôle and continues to advocate window-gravity ventilation on economic grounds—grounds as uncertain as were the previously advanced (and now admitted—erroneous) ideas of health. It is indeed unfortunate that the whole subject could not have been considered dispassionately and scientifically, free from the influence of preconceived notions that have colored the conclusions.

For the student of the science, as for the practitioner of the art, this little volume, with its ambiguities, inconsistencies and contradictions, will be a wholly inadequate and unsatisfactory guide to the principles and practices of school ventilation.

THOMAS J. DUFFIELD

**Jurisprudence for Nurses**—By *Carl Scheffcl, Ph.B., M.D., LL.B.* New York: Lakeside Publishing Co., 1931. 166 pp. Price, \$2.00.

Every practising nurse is dogged by the law and it behooves her, therefore, to know something about the legal rights and responsibilities of her profession. This practical book supplies the information in a concise and useful form. It deals with such subjects as the legal status of nurses, their legal obligations, their relationship to contracts and wills, and their criminal responsibilities.

Topics such as these are as essential to the education of a nurse as is a knowledge of bacteriology or chemistry. The application of these facts should serve to prevent litigation and promote efficiency in the business and professional relationships of nurses. The book is well printed, has a good index, and contains lesson quizzes at the end of each chapter. It should be indispensable to all practitioners of nursing, especially since it is the only text of its kind.

JAMES A. TOBEY

**Handwashing in Schools**—*Report of a study made by Cleanliness Institute, New York, N. Y.*

The object of this study was to determine the extent to which the 26 million school children in the United States are having a chance to practice handwashing at school. Data were gathered from a representative group of 145 schools (124,088 pupils) of every type, geographically distributed in 15 states scattered throughout the coun-

try, and with widely varying forms of organization. Findings include information regarding the presence of adequate equipment (hot and cold water, soap and drying facilities in sufficient amounts), its location, and the type of school organization (interest of teachers and administrators, provision of time for handwashing under supervision, and care of equipment). In the majority of the schools studied, equipment was found to be inadequate, but in every case more efficient organization would have made its use more effective.

In addition, through the coöperation of 21 manufacturers, and other companies, an intensive study of various types of handwashing in actual use was made in 8 of the schools in Newton, Mass. This investigation demonstrated the practicability of different types of equipment, and gave data on time, water, and soap consumption per 100 handwashings under varying circumstances and in different locations.

Facts and figures are clearly arranged, and the inquiry has materially advanced our knowledge concerning handwashing among the school children of the United States.

RUTH I. PARSONS

**The Conquest of Old Age. Methods to Effect Rejuvenation and to Increase Functional Activity**—By *Peter Schmidt, M.D.* New York: Dutton, 1931. 307 pp. Price, \$5.00.

This book is a defense of the Steinach operation, the author having been a disciple of Steinach.

The first part of the book, devoted to endocrinology, is sound and interesting, and the author gives a number of case histories backed up by photographs "before and after" which almost force conviction. Unfortunately the book is addressed to laymen as well as doctors and we have already had too much evidence that this is a dangerous matter to bring before the public. One point

in which we thoroughly agree with the author is his statement in the preface that he hopes "to do away with the stigma of the ludicrous which has hitherto attached to the physiologist in the laboratory and to the clinician in his daily practice as far as attempts at rejuvenation are concerned."

It is interesting to know that the author committed suicide, in spite of his firm belief in the possibility of rejuvenation. The book is unfortunately marred by attacks on physicians which accuse them of prejudice, obtuseness and self-interest which leads them to distortion of facts and unfairness.

The book can be commended to those who know enough of medicine to judge properly of its worth, but not to the public. The make-up is excellent.

MAZYCK P. RAVENEL

**Kansas City Health and Hospital Survey**—*Prepared by The Committee on Administrative Practice of The American Public Health Association and the Kansas City Public Service Institute. Made under the direction of the Committee on Public Health and Welfare of the Chamber of Commerce of Kansas City, February, 1931. 329 pp. Price, \$2.00.*

Where complex factors are involved, the first step toward betterment is a study of existing conditions. Such a preliminary study is essential where public health is concerned; public health has so many social, industrial, economic, and individual factors that an extensive program of betterment will fail unless those who propose it have prepared the way by finding out what is actually being done, by studying the opportunities for betterment, and by securing in advance the adherence of an interested body of opinion. This procedure seems to have marked the Kansas City Health and Hospital Survey.

In general the survey gives evidence of being carefully made, and it is liber-

ally provided with illustrative figures and charts. It is easy to read because of the literary presentation of its material and the excellent work of the printer.

This journal has an especial interest in certain matters presented. The chapter headings, Maternal and School Hygiene, Public Health Nursing, Industrial Hygiene, and Popular Health Education, suggest possibilities not always fully appreciated and certainly only partially attacked. The Kansas City report does not touch on the possibilities of mental hygiene activities in these fields. It remarks that there is no nursing service for mental hygiene. Special classes for mental defectives are noted. For over a dozen years Kansas City has maintained a psychological laboratory where studies are made on the difficulties of backward children.

More is said about other matters and there is a chapter on mental hygiene. The inadequacy in conception and in administration of the city's provision for the mentally ill is commented on and hope expressed for something better. Apparently little improvement has occurred in these facilities since the Missouri Survey over a decade ago. Where a municipality is negligent in such matters, the influence of the state should inform and correct public opinion about the matter. But the philanthropic and socially minded of Missouri are still struggling with the problem of making the activities of the state anywhere nearly adequate to the needs so that no pressure on municipalities may be expected from that source for many years. Perhaps the colored mental patients are even less well cared for than the white.

It is possible that there will again be in Kansas City a medical school operated and supported by the Commonwealth. If this be so, we hope that the policy of German university cities may be followed, and that the psychopathic hospital may be part of the university

hospital group, under the direction of the professor of psychiatry, operated for the benefit of all persons in the community who fall ill of mental disorders, and at the same time used as a teaching center. Then physicians who go out from the school of medicine will carry an adequate understanding of disorders that affect the mode of behavior and the body of belief of the individual, and a suitable knowledge of how to treat them and where to refer those who need more special care.

Time was when a health survey might not include the field of mental hygiene, but now this topic is sure to receive thoughtful attention. A careful study will in time be followed by appropriate action.

S. W. HAMILTON

**General Bacteriology**—By *Edwin O. Jordan, Ph.D.* (10th ed. rev.) Philadelphia: Saunders, 1931. 819 pp. Price, \$6.00.

This has been a standard text since 1908, when the first edition appeared. It has now reached the tenth edition, and in the meantime has undergone a number of revisions and many reprints, a history which proves that it has won its way on its merits.

The size of the present volume has been increased by some 40 pages. The chief changes are in the sections on variation, undulant fever, the paratyphoid group, the filterable virus diseases, the pathogenic yeasts, and the anaerobes. A number of new and good illustrations have been added.

We cannot but commend the author for his treatment of Nomenclature. He has used "tentatively" some of the newer suggested generic names, although he holds, we believe correctly, that the names of bacteria will continue to be ruled by convenience until a general and rational system can be worked out by international agreement.

It seems supererogatory to commend a volume which has attained such a firm

position in the literature of bacteriology. We can only say that this latest edition upholds the standards set by the first and those which have succeeded each other in the meantime.

The printing and make-up are excellent.

MAZYCK P. RAVENEL

**Industrial Accident Prevention, A Scientific Approach**—By *H. W. Heinrich.* New York: McGraw-Hill, 1931. 366 pp. Price, \$4.00.

This work is one of the publisher's series of insurance manuals and is especially designed for industrial executives and safety engineers.

It is based upon 17 years' experience with the engineering and inspection division of the Travelers Insurance Company and the accident publications which have appeared from time to time from that company are incorporated herewith. It is the author's contention that science may be applied practically and successfully to the prevention of accidents, using the term "science" in the sense of knowledge of principles or facts. The principles laid down have been applied so extensively that they indicate beyond a doubt their practicability and effectiveness.

All the essential principles are discussed in the first chapter, the remaining chapters simply developing various phases of the subject. Method is stressed more than detail, on the theory that, if it be properly selected and applied, satisfactory results must eventually follow. The chief danger at present is in assuming that industry is already well enough acquainted with the principles and now applies them effectively in practice.

The four fundamental principles of accident prevention are executive interest and support, cause-analysis, selection and application of remedy, and executive enforcement of corrective practices. Nearly 100 pages are devoted to guarding—practically all of the 150-odd il-

illustrations falling within this chapter. Eleven appendixes, comprising some 85 pages in smaller type and numerous tables, amplify the text.

The subject matter is comprehensive, well assembled, spiced with numerous case citations and experiences, and constantly emphasizes the necessity for determining the hazards for the given individual rather than general or mass hazards, which seems reasonable. A brief bibliography accompanies. The type, general get-up and printer's art are in keeping with the usual excellency of this well known publishing house.

EMERY R. HAYHURST

**The Community and Social Welfare**  
—By Cecil Clare North. New York: McGraw-Hill, 1931. 359 pp. Price, \$3.50.

Too often our public health programs, particularly when they are planned by state or national executives, ignore the fundamental fact that an effective program must be a community program, designed not only to fit the public health needs of the particular community but also taking cognizance of the other local social problems and machinery.

This study of community organizations is useful to the public health worker not so much for the chapter on a program for health, in which there is little if anything which will be new to him, as it is for its rather complete and attractive presentation of the whole community problem to which the health program must be adjusted.

The discussion of public and private agencies is particularly pertinent to the public health field and the soundness of the viewpoint is indicated in the comment:

The consensus of informed opinion everywhere has been that the system of public health administration is a pernicious one and that the greater progress toward satisfactory public administration will be secured by retaining the expenditure of all pub-

lic funds in the hands of public officials and developing in private agencies the independent position that comes from raising their own funds.

HOMER N. CALVER

**Dietary Suggestions**—By C. D. Christie, M.D., A. J. Beams, M.D., and E. M. Geraghty. Chicago: American Medical Association, 1931. 156 pp.

Books on dietetics have generally been prepared either for the more or less normal person or for the individual who is hospitalized. This one differs from most others in that it is intended for the "vertical patient." It discusses diets suitable for constipation, gastric disturbances, and diabetes, and also high caloric, low protein and reducing diets. In each instance there are offered many practical recipes which the physician may prescribe for the ambulant patient in need of such diets.

All of the valuable material now conveniently assembled in this well printed little book appeared during 1930 in the *Journal of the American Medical Association*, and *Hygeia*. Dr. Beams collaborates with Miss Geraghty in 5 of the 7 chapters, while Dr. Christie is credited as co-author of the section on diabetes only. As Dr. Morris Fishbein states in a brief introduction, this useful book should meet with a wide and favorable reception.

JAMES A. TOBEY

**Abstract of Literature on the Production, Processing and Distribution of Fresh Milk. Vol. I.** Chicago: International Association of Milk Dealers, 1931.

We have received from the Executive Secretary of the International Association of Milk Dealers the above mentioned volume of abstracts. The work has been done under the sponsorship of the Committee on Laboratory Methods of the association.

The abstracts cover the literature in practically all fields and departments of the fresh milk industry, including production, processing, quality control, and



distribution. For each the name of the original author and its source of publication are given.

The work has been well done and doubtless will furnish to milk producers much material which will aid them and be of benefit in improving the quality of the supply. MAZÏCK P. RAVENEL

**The History of Paediatrics—the Progress of the Study of Diseases of Children up to the End of the XVIII Century—***By George Frederick Still, M.D. (Cantab.), Hon. LL.D. (Edin.), F.R.C.P. (London).* New York: Oxford University Press, 1931. 526 pp. Price, \$8.00.

Dr. Still has upheld the reputation of the scholarly Englishmen in his choice of diction and careful selection of historical material with which he traces the evolution of pediatric thought from the 4th century before Christ to the end of the 18th century. This absorbing volume supplements and extends the excellent biographical and historical material already published by Caulfield, Garrison, Ruhrah, Sudhoff, and Foote.

It is a delight to be guided through the mazes of thought concerning childhood diseases by one who has so thoroughly sifted and so logically arranged his material. While they are presented in chronological order, the biographical sketches are interwoven to present a continuous story. First of all, one turns naturally to the early history of infant feeding, the difficulties encountered, and the solutions offered. The earliest de-

scriptions of diphtheria and rickets will bear careful reading today. The chapter on the first children's dispensary in England is replete with personal incidents in the life of George Armstrong, its founder. That "George Armstrong deserves an important niche, not only in the history of paediatrics, but in the history of social welfare" is convincingly shown.

The volume is made more interesting by the facsimile reproductions of the title pages of a number of the classics in medicine. Full page portraits of the pioneers in pediatrics add much to the volume. RICHARD A. BOLT

**Some Biting Remarks—***By Happy Goldsmith.* New York: Barnes, 1931. 43 pp. Price, \$.75.

Merely to announce that Clifford Goldsmith has written a book should send the throngs to the book store to get a copy immediately. In both the text and the sketches Professor Happy is here at his best. From its stunningly brilliant cover to its last hilarious line it is stimulating entertainment for old and young.

This is a book to inspire the health educator; it is first aid for the teacher and the parent; and, for the week-end guest who must take a gift to the children, it's like finding your carfare.

The reviewer's principal advice to the reader is not to start on this book when he is hungry because if he does he will run right out to luncheon and order spinach. HOMER N. CALVER

# A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Mental Hygiene Publicity**—Has an eager public been oversold on mental hygiene? The answer seems to be "no," not on the right kind of educational material, of which more is needed to counteract the efforts of charlatans, faddists, and well-meaning but misguided reformers.

DAVIES, S. P. What Grown-Ups Cry For. *Survey Graphic*, 20, 3: 253 (Dec.), 1931.

**The American Family**—What restricted immigration, divorce, birth control, urbanization, industrialism, and other social factors are doing to American statistics. Population is increasing, the sex ratio is becoming equalized, the size of the family is decreasing but there are more families. An excellent and stimulating paper.

DITMER, C. G. Uncle Sam's Family. *Survey Graphic*, 20, 3: 249 (Dec.), 1931.

**Fish**—"Among the many food faddists that have existed, there has not yet been a fish fad." The author thereupon does what he can to make up for the deficiency by featuring fish for fighters, fish for children—whole families, in fact.

GETTEN, D. H. The Place of Fish in the Dietary of Adults and Children. *J. State Med.*, 39, 11: 656 (Nov.), 1931.

**Epidemic Meningitis Movements**—The general epidemiologic characteristics of meningitis are studied. The evidence indicates a surprisingly large proportion of the population infected during epidemics. The highly variable inter-epidemic interval is from 6 to 12 years.

HEBER, A. W. The Movements of Epidemic Meningitis, 1915-1930. *Pub. Health Rep.*, 46, 46: 2769 (Nov. 13), 1931.

**Voluntary Euthanasia**—This elo-

quent plea for the legalization of voluntary euthanasia (easy death) for victims of hopeless, painful conditions was the presidential address delivered at a recent meeting of British Medical Officers of Health.

MILLARD, C. K. The Legalisation of Voluntary Euthanasia. *Pub. Health*, 45, 2: 39 (Nov.), 1931.

**Kentucky Maternal and Child Health Project**—How the county health unit has developed its maternal and infant hygiene activities is interestingly set forth in the description of two county projects.

PRATHER, H. E., and GRATT, E. R. A County Health Department Program for Maternal and Child Health. *South. M. J.*, 24, 11: 963 (Nov.), 1931.

**Physical Educational Trends**—An excellent statement of the shift in emphasis from physical training to health education, of interest to health workers generally.

ROGERS, J. E. Trends in Physical Education. *J. Health & Phys. Ed.*, 2, 8: 19 (Oct.), 1931.

**Research in Nutrition**—"We should not look for quick results from improvement in human nutrition . . . the benefit of better feeding usually becomes fully apparent only when continued throughout a large part of the life cycle and often the benefit is greater to the second generation than the first." These observations are a part of a most interestingly presented discussion of some of the vitamins.

SHERMAN, H. C. Some Recent Advances in the Chemistry of Nutrition. *J. A. M. A.*, 97, 20: 1425 (Nov. 14), 1931.

**School Children's Teeth**—Among the many most important findings of this study of more than 12,000 oral

examinations is this startling one: 90 per cent of children in each age group had one tooth or more decayed, missing or filled.

STOUGHTON, A. L., *et al.* Dental Decay and Corrections Among School Children of Different Ages. Pub. Health Rep., 46, 44: 2608 (Oct. 30), 1931.

**What Is Health Consciousness?**  
—Is it an introspective, emotional concern with one's "innards" or a deep concern in applying the present knowledge of health promotion and disease control for the benefit of all? There is plenty of opportunity for speculation in the answer.

SUNDWALL, J. Are We Becoming Overly Health Conscious? J. Health & Phys. Ed., 2, 8: 9 (Oct.), 1931.

**Diphtheria Immunity and Tonsillectomy**—Schick and Fopper reported a noticeable reduction in Schick test reactors among tonsillectomized children (see Bibliography of Jan., 1930). This finding was not confirmed in a Baltimore study of school children and adults, as no significant difference was discerned between those operated upon and those still enjoying their tonsils, whether in a normal or pathologic condition.

WHEELER, R. E., *et al.* Antitoxic Immunity to Diphtheria in Relation to Tonsillectomy Am. J. Hyg., 14, 11: 555 (Nov.), 1931.

## BOOKS RECEIVED

THE MENTAL DEFECTIVE. By Richard J. Berry and R. G. Gordon. New York: McGraw-Hill, 1931. 225 pp. Price, \$2.50.

NURSERY EDUCATION. Report of the Committee on the Infant and Preschool Child—White House Conference on Child Health and Protection. New York: Century Company, 1931. 187 pp. Price, \$2.00.

APPROVED LABORATORY TECHNIC. Clinical, Pathological, Bacteriological, Serological, Biochemical, Histological. By John A. Kolmer, Fred. Boerner, assisted by C. Zent Garber. New York: Appleton, 1931. 663 pp. Price, \$7.50.

THE BLACK DEATH AND MEN OF LEARNING. By Anna Montgomery Campbell. New York: Columbia University Press, 1931. 210 pp. Price, \$3.00.

LIVING THE LIVER DIET. By Elmer A. Miner. St. Louis: Mosby, 1931. 106 pp. Price, \$1.50.

PHANTASTICA, NARCOTIC AND STIMULATING DRUGS, THEIR USE AND ABUSE. By Louis Lewin. New York: Dutton, 1931. 335 pp. Price, \$3.75.

ALLERGY AND APPLIED IMMUNOLOGY. By Warren T. Vaughan. St. Louis: Mosby, 1931. 359 pp. Price, \$4.50.

Conquering Arthritis. By H. M. Margolis. New York: Macmillan, 1931. 192 pp. Price, \$2.00.

THE INSECT MENACE. By L. O. Howard. New York: Century, 1931. 347 pp. Price, \$3.50.

WHITE HOUSE CONFERENCE ON CHILD HEALTH AND PROTECTION. Health Protection for the Preschool Child. New York: Century, 1931. 275 pp. Price, \$2.50.

THE SCIENTIFIC BASIS OF SOCIAL WORK. A Study in Family Case Work. By Maurice J. Karpf. New York: Columbia University Press, 1931. 442 pp. Price, \$3.75.

# NEWS FROM THE FIELD

## POLIO MYELITIS—MULTIPLE CASES IN A FAMILY

Our present conception of the epidemiology of poliomyelitis was well set forth by Aycock in a recent number of the *Weekly Bulletin*. During the course of the present outbreak of poliomyelitis in this city we have kept a record of the number of instances in which two or more cases have occurred in a single family. The results of the inquiry fit in with Aycock's idea that, while the virus of poliomyelitis is widespread, infection going on to paralysis is rare. Were it otherwise we should expect to see multiple cases of the disease in a considerable proportion of the families where the infection has appeared.

From January 1 to October 3 nearly 4,000 cases of poliomyelitis were reported to the Department of Health. The number of families in which more than 1 case occurred was only 111.

These multiple cases are still being analyzed, for it is important to determine in how many instances it seems probable that infection was spread from one patient to the other, and how many probably represented an infection from the same source. The distribution of the multiple cases was as follows:

MULTIPLE CASES OF POLIO MYELITIS IN NEW YORK CITY, JANUARY 1 TO OCTOBER 3, 1931

	Families with 2 cases	Families with 3 cases	Total cases
Manhattan ..	15	0	690
Bronx .....	10	0	546
Brooklyn .....	66	1	1,951
Queens .....	9	1	587
Richmond ...	8	1	151
City .....	103	3	3,925

—*Weekly Bull.*, City of New York Department of Health.

## WESTERN BRANCH MEETING IN DENVER

THE Third Annual Meeting of the Western Branch, American Public Health Association, will be held in Denver, June 2, 3, and 4, 1932. The meeting will adjourn on Saturday, June 4, to the meeting of the National Tuberculosis Association in Colorado Springs, only 60 miles away, which occupies the following week. Eastern representatives to the meeting will include Dr. Louis I. Dublin, Dr. E. L. Bishop, Dr. John A. Ferrell, and Dr. Kendall Emerson.

## SCHOLARSHIP IN HEALTH EDUCATION

A FULL tuition scholarship of \$500 is available in the field of health education at Massachusetts Institute of Technology (Department of Biology and Public Health) for 1932-1933, to cover the full scholastic year from September to June. This scholarship will be awarded to a candidate recommended by the National Tuberculosis Association, the award to be made in June, 1932. Applications should be received not later than May 15, and those interested are invited to write to the Child Health Education Service of the National Tuberculosis Association, 450 Seventh Avenue, New York, N. Y.

## INDUSTRY'S YOUNG WOMEN MOST FREQUENTLY INJURED

THE largest numbers of industrial accidents to New York women for any age group during the years ending June 30, 1929 and 1930, were found to occur among girls 18 and 19, according to a special bulletin of the New York State Department of Labor. Out of a total of 8,091 injuries to women during the first year, 473 were to women

18, and 399 to women 19 years of age. The year following, 591 and 529 respectively were found in the 18 and 19 year groups.

#### LESLIE DANA GOLD MEDAL

THE Leslie Dana Gold Medal, awarded annually for "outstanding achievements in the prevention of blindness and the conservation of vision," was presented to Edward M. Van Cleve, of New York, Principal of the New York Institute for the Education of the Blind. Mr. Van Cleve was selected for this honor by the National Society for the Prevention of Blindness in coöperation with the St. Louis Society for the Blind through which the medal is offered by Leslie Dana.

The Leslie Dana Medal was awarded last year to Dr. George E. de Schweinitz, of Philadelphia, former President of the American Medical Association, of the American Ophthalmological Society, and the College of Physicians of Philadelphia. In 1929 the Medal was awarded to the late Dr. Ernest Fuchs, of Vienna, Austria, who was recognized in his profession for a number of years before his death as "the world's greatest ophthalmologist."

#### ROVING WITH THE MIGRANTS

SOCIAL centers among migrant families working in fruit and vegetable canneries and on truck farms and ranches in the Chesapeake area, southern New Jersey, Colorado, and the Pacific Coast, are being conducted in connection with a study of migratory labor by the Council of Women for Home Missions, in which 15 Protestant denominations coöperate. The service given in these centers, as described in a book entitled "Roving with the Migrants," includes day nurseries, first aid, instruction in cooking and nursing, and supervised play.—U. S. Children's Bureau, Washington, D. C.

#### HOSPITAL SCHOOL IN LISBON

MANUAL work, singing, and drawing, in addition to ordinary elementary school subjects, are being taught to patients 3 to 10 years of age in a hospital in Lisbon, Portugal. This work was established through the efforts of one of the physicians. It is staffed by two trained teachers, and though maintained by private contributions it is officially recognized as a public school. Motion pictures and other entertainments help to interest and amuse the children.—U. S. Children's Bureau, Washington, D. C.

#### AFTER-CARE FOR INFANTILE PARALYSIS VICTIMS

NEW York City hospitals caring for infantile paralysis patients have been requested to report the discharge of such patients to the Children's Welfare Federation of New York, which has undertaken to see that they have proper after-care. Nursing organizations in each borough have agreed to give treatments under the direction of a physician, and, when necessary, to connect patients with orthopedic clinics and to provide braces and transportation. Cases not registered with the federation will be followed up by health department nurses. This plan has been adopted with the approval of the hospitals and the city commissioners of health, according to an announcement in the *Journal of the American Medical Association*.—U. S. Children's Bureau, Washington, D. C.

#### DELAWARE'S SCHOOL DENTAL PROGRAM

DELAWARE has this year instituted for its public schools a dental program which requires that all children in the first six grades shall be examined by a dental hygienist. The present first-grade children are to be reëxamined at their completion of the third grade and the sixth, the results of the care received

being recorded. The actual work on the children's teeth is to be done by private dentists selected by the parents, and on completion of the work the dentists are requested to sign the cards on which the hygienists indicated the repairs needed.—U. S. Children's Bureau, Washington, D. C.

## PERSONALS

ELLENORE VON ELTZ has become publicity secretary of American Nurses' Association, New York, N. Y.

DR. WILLIAM W. BAUER of Racine, Wis., F. A. P. H. A., has been appointed assistant secretary of the Bureau of Health and Public Instruction, to succeed Dr. Rosco G. Leland, who was elected to the secretaryship of the Bureau of Economics at the February meeting of the American Medical Association Board of Trustees. Dr. Bauer will take up his new duties about the first of the year.

BRIGADIER-GENERAL M. A. DELANEY, U. S. Army, F.A.P.H.A., was recently promoted from Colonel, Medical Corps, by President Hoover. He returned recently from Manila, P. I., where he was Medical Adviser in Public Health and Sanitation to Governors General Henry L. Stimson and Dwight F. Davis. He was formerly White House physician to President Taft.

DON M. GEISWOLD, M.D., DR.P.H., F.A.P.H.A., has been provisionally appointed consulting epidemiologist on the staff of the Division of Communicable Diseases, State Department of Health, Albany, N. Y.

ADMIRAL CAPY T. GRAYSON, M.D., an alumnus of the Medical College of Virginia, Richmond, delivered its founder's day address on December 1, to mark the 94th session of the institution. His subject was "The Modern Trend of Medicine."

## DEATHS

DR. ROLAND H. STUBBS, former Health Officer of Waterford, N. Y., Member A. P. H. A., died recently in the Leonard Hospital, Troy, N. Y., at the age of 77. He was one of the original staff of the hospital, and was a medical examiner for the New York Life Insurance Company for 35 years.

MAJOR-GENERAL SIR DAVID BRUCE, British medical officer, died recently at the age of 76, on the day of the funeral of his wife. He was best known for his researches on tropical diseases, sleeping sickness and Mediterranean fever, and in 1924 was president of the British Association for the Advancement of Science.

## CONFERENCES

January 12-16, Pure Air and Clean Streets Exhibit, New York Academy of Medicine, New York, N. Y.

January 22-23, American Social Hygiene Association, New York, N. Y.

January 25-29, Second Heating and Ventilating Exposition, Cleveland, O.

April 4-8, American College of Physicians, San Francisco, Calif.

April 11-15, American Nurses Association, San Antonio, Tex.

April 11-15, National Organization of Public Health Nursing, San Antonio, Tex.

April 11-15, National League of Nursing Education, San Antonio, Tex.

May 10-15, Annual Congress of The Royal Institute of Public Health, Belfast, Ireland.

June 2-4, Third Annual Meeting, Western Branch, American Public Health Association, Denver, Colo.

June 6-9, National Tuberculosis Association, Colorado Springs, Colo.

July, The Second International Conference of Social Work, Frankfurt, Germany.

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### Dental Policies in a Public Health Program\*

ALFRED WALKER, D. D. S., F. A. C. D.

*Chairman Advisory Committee, Murry and Leonie Guggenheim Dental Clinic; the Community Dental Service; New York Tuberculosis and Health Association, New York, N. Y.*

AS I see the implications in the title, this paper should cover the following points: (1) the question as to whether dental care is of real concern in a public health program and why; (2) what type or types of dental programs are to be advocated for inclusion in a public health program, including a consideration of the proportionate attention which the teeth should have in the program; (3) the technic which should be followed in the dental program or programs.

First, we are to consider whether the care of the teeth is a proper part of a public health program. It is rather generally agreed that disease of the teeth and adjoining structures is detrimental to the general health. Statements to this effect are made and accepted practically without question,<sup>1</sup> yet I venture to say that the views of the average health officer on this point are rather vague. As a matter of fact, perusal of dental and medical literature reveals the fact that, while much attention is being given to individual cases where such relationship is suspected, no worthwhile statistical studies are on record tending to show the effect of dental disease on the health of a community. I believe that one of the early studies needed in this field is a survey along the lines just indicated.

Another point in this connection to be noted is that by far the largest number of cases of focal infection reported deal with adults or

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\* Read before the Child Hygiene Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 15, 1931.

those beyond school age. We seem not to have applied the lessons so learned to the school child, especially from the preventive aspect. Sufficient cases are on record, however, to indicate that acute rheumatic fever, heart trouble, chorea, kidney disease, and other ailments, frequently occur in childhood and have a definite focal infection as background. Care of the teeth is quite as important in the effort to prevent or treat these diseases as is attention to the tonsils.

The cutting down in efficiency of mastication when teeth are diseased is a point to be considered. Its influence is so obvious that it need only be mentioned.

Another aspect of dental disease which requires consideration is the effect of such disease both directly and indirectly on earning power. Indirectly, the loss of teeth results in disfigurement which may frequently have an unfavorable influence on the ability to secure employment. The psychological effect on the individual may also have an adverse effect on earning power. More directly, dental disease through its influence on health may result in enforced idleness, economic loss here being accentuated by the cost of medical treatment. This aspect of dental disease should be made the object of careful statistical study, which would of course involve the consideration of the dental as well as health condition, and would, therefore, call for assistance from both the dental and medical professions. I have no hesitation in stating, however, even without the backing of such a study, that dental disease is a serious menace to the health of the entire population from childhood on, and will, therefore, continue the discussion as though this statement were universally accepted. The conclusion may then logically be drawn that teeth occupy a major place in a public health program.

Dental policies in a public health program naturally center on the child. There has been too much of an assumption in the past, based on convenience, that this question could be confined in its application to the *school* child. The trend of all recent researches in this field of dental care indicates that to begin with the school child is to start very nearly too late. Inconvenient though it may be, we must accept at the outset the dogma that an efficient dental program must have as its starting point an age well below that at which the child enters school. Let us not assume, however, as has been done by more than one student of this problem, that good dental care in the early years of life will eliminate the need for dental care later on. Even good teeth have been known to suffer from disease under unfavorable influences to which they may readily be exposed during the years when the child is in school. We may as well recognize at the outset that there is no



panacea for dental ills; no immunizing vaccine which once administered will afford lasting protection. In other words, if a dental program is adopted and put into effect, it should be one which there is reasonable expectation of maintaining over a considerable period of time. It might be embarrassing to be in the position of the man who caught hold of the tail of the bear and found that he could not let go.

When we come to recommend a dental policy to administrators of public health programs, we find ourselves confronted with the need for making a selection from one of several quite dissimilar programs which have been advocated by various members of the dental profession. This is a cause of some embarrassment to our profession, since it indicates rather clearly to those outside of it that the ideal program has not yet been discovered. It means that we must decide on such theories as all dentists can agree on, and present these with the entire weight of united dental opinion behind them. As it happens, those things on which all the members of our profession can agree are also the most economical procedures to employ in a broad public health program.

We find it possible to classify these procedures under

I. Education

II. Examination of individual mouths and limited dental treatment for a young age group

III. The continuance of the second plan into the higher age groups with a more extensive treatment program

It will be understood that the educational program specified under I would also be included in II and III. Because of the fact that dental treatment for children has certain aspects which set it off from the rest of dental practice, so that it is even considered a specialty by some, there arises also the question as to whether (a) the community dental program for the child should be universally applied, or (b) be confined to indigents. If (b) is accepted it is then to be decided whether the educational part of the program should be spread over the non-indigent as well as the indigent group.

It may be the simplest avenue of approach to consider the points just raised in the inverse order of presentation. We will accordingly discuss the educational phase of the dental program in so far as this is given in and through the schools. It is obvious that it will cover all economic levels as far as they are represented in the school population. It requires no further effort or greater expense to reach the non-indigent group with the educational efforts that are put forth. If the

educational program is to be carried to the preschool child and the expectant mother, as it is only logical that it should, it would seem wise to make a distinction between the indigent and the non-indigent groups. However, experience has indicated that the prosperous members of the community do not acquire dental knowledge along with their greater income; nor is their interest in the teeth of their children and desire to have dental defects cared for proportionately greater than among the indigent. If dental disease is a community problem, as I believe it to be, the dental educational program should have universal coverage.

With regard to points (a) and (b), my previous remarks indicate that the requirements of indigent children will be so heavy as to eliminate the question of providing community dental service for the non-indigent, except as a purely academic question. Dental care for the indigent is both an individual and a community problem. Whether it can justify itself on purely economic grounds as a means of avoiding general illness and disability and the economic losses entailed thereby, can be determined only by a fair and thorough trial. Such a trial would be of tremendous value even though the answer to the question proposed might be in the negative.

Coming now to programs I, II, and III, I may well summarize I by quoting from the Iowa Plan for Dental Health Education.

The objective of dental health education is to bring about a universal observance of the fundamental principles of preventive dentistry, to the end that we might have healthier, happier and more efficient men and women.

The Iowa "Plan No. I without mouth inspection" is the one which is advocated by its proponents, and is thus described:

The experience of the Bureau (of Dental Hygiene, University of Iowa) in the State of Iowa has indicated that there is but a slight relationship between a school dental inspection and a successful dental program. . . .

The success of any health program is directly dependent upon the ability of the teachers and nurses, especially the former, to interest the children.

The plan therefore urges the child to visit the family dentist for the mouth inspection, which method is undoubtedly more educational in its effect than a hurried examination made in the school room by a dentist.

The immediate objectives to be sought after (are)

1. To get all children to eat foods that build good teeth
2. To get all mouths in each (school) room free from decayed, abscessed and stained teeth
3. To get all children to have their own toothbrushes and to brush their teeth at least once each day

This is a program which is designed to give information and arouse interest, and should result in the greatest number of those financially able seeking dental services for their children. It is to be remembered that under this even examination of the teeth is excluded by preference, on the assumption that this as well as dental treatment is the function of the dentist in private practice or clinic. This should be regarded as the minimum dental plan. Its benefits are undoubted and its results in time will unquestionably justify the money required for its administration.

Plan II is based on the supposition that educational efforts alone will not prevent a very large amount of dental disease, which will therefore become a community charge just as is disease of more serious proportions. To treat dental disease, when it has occurred, naturally necessitates its detection. Therefore the minimum program of dental treatment consists of careful examination of the teeth at intervals of 6 months, with charting of any caries or gingival disease which may be discovered. This should be supplemented by what is commonly called cleaning the teeth or, as the dentist usually phrases it, prophylactic treatment, included with which there is to be a definite educational message and careful instruction in the use of the toothbrush.

The prophylactic treatment usually given by the dental hygienist has been attacked in recent years as being less than its name implies. In other words, it is stated that the cleaning of the teeth by the dentist or dental hygienist does not prevent decay. If we stop the prophylactic treatment with simple cleansing of the teeth, we may agree that this claim is largely true; but the prophylactic treatment is, in the first place, an object lesson in the care of the mouth, and if it is accompanied by an educational talk designed to stimulate the interest of the patient in keeping his teeth clean by daily brushing, as it should, it then becomes a potent weapon of defense against disease. It is for this reason that I specify that the prophylactic treatment must include adequate demonstration of toothbrush technic. Another justification of the cleansing of the teeth by the dental hygienist is that the educational message can be most effectively delivered while the patient is in the chair. If for no other reason, this might well justify the time spent in this operation.

Plan II, as just outlined, is one which requires no complicated equipment. The salaries of dental hygienists are less than those of dentists of corresponding experience and ability. While suitable rooms and facilities must be provided, a considerable part of the equipment may be of a portable type thus cutting down the investment and

making it possible to cover a considerable territory with a limited number of operators.

Plan II by its nature is relatively most effective with the younger age groups. As children get older, those who cannot afford dental care develop caries to a certain extent in spite of the educational and prophylactic efforts, and the time of the dental hygienist is therefore less productive of positive benefit. This program should, therefore, be limited to children below 6 years of age, with special effort to reach the preschool child.

Plan III includes the features of plans I and II, and adds the filling of cavities, extraction of such teeth as require it, and treatment of inflamed gums. The protective operations known as prophylactic odontotomy, if done at all, would fall under III. There still remains considerable misunderstanding about this particular protective measure, and it should be undertaken only by those who fully comprehend its application. Plan III should cover the older age groups as far as is financially possible. This requires the services of dentists and a more expensive and less mobile equipment. In this connection, however, it should be noted that in some communities much success has been attained through the use of a travelling dental clinic set up in a large bus. The principal expense, of course, is for dentists' salaries, supervision and supplies, and it is also to be borne in mind that the community which undertakes to treat teeth for its indigent children has assumed a responsibility which it cannot lightly put aside after a short period.

I call attention to the fact that sponsors of dental treatment programs have often taken the stand that they would limit the children so treated to a narrow age range, one corresponding roughly to the kindergarten and the first grade. There has been a possibly unconscious assumption that, if cavities occurring at the age of 6 or 7 were filled, Divine Providence would take care of any that formed subsequently if the child could not afford to pay for dental service. The lack of logic in such a program should be obvious.

To extend the age for dental treatment is not so expensive as it might at first seem, inasmuch as mouths under constant supervision do not as a rule develop large cavities. To start a program of fillings at a sufficiently early age, especially in conjunction with educational and prophylactic effort, is to cut the cost of such treatment per child to a very reasonable figure. Such a program cannot be made to reach as many children as the more limited age program, but at least the work which is done is not lost in a short time, and remains a permanent asset. I do not presume to set the upper age limit for this program, but believe that in fairness to the child it should coincide approximately with the age at which wages may be earned.

It would be unfair to close this paper without some comment on the subject of diet, of which so much is heard today. I do not decry the attention which vitamins are receiving, but believe that the angle of approach should be that of the general health, rather than a specific effort to influence tooth structure. I look upon dental disease not as a local condition, but as indicative of a shortcoming somewhere in the body. In other words, if we have perfect health, we should have perfect teeth. On the other hand, I think of diet, as something that the physician should prescribe, something distinctly in his domain. I would like furthermore to record by belief that the problem of dental disease will not be solved by the dietary route alone, but that this is simply one agency, quite as important an agency being mouth hygiene, i.e., the care of the mouth by the patient, the dental hygienist and the dentist.

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## Spain

THE new Constitution of Spain, unlike that of the Spanish Monarchy, contains clauses on child welfare. For instance, it specifies that the family is to be under the special protection of the State. Parents are required to feed their children, to care for them, and to give them an education. The State is to watch over the enforcement of this law and to provide financial aid to needy parents. Parents have the same duties to their children of illegitimate birth as to those born in wedlock. The State also assumes the duty of protecting mothers and children and accepts the principles of the Children's Charter of Geneva.

The Constitution makes primary instruction free and compulsory. The State is ordered to enact legislation for the purpose of enabling all citizens of small means to obtain any education they desire.

*Other Child Welfare Measures by the New Government*—A recent decree provides for the organization of a Division of Child Hygiene in the Bureau of Public Health. The division will also do prenatal work and work for the prevention of maternal mortality.

Another decree orders the establishment of school lunch rooms throughout Spain to be managed by the local school authorities under the supervision of the State. The funds will be supplied jointly by the State and the municipalities; private donations will also be accepted. The decree points out the importance of establishing as many such lunch rooms as possible and of reaching the greatest possible number of children.

The municipal Government of Valencia has decided to reserve a certain park in that city exclusively as a playground for children on certain hours a day in order to remove them from the streets of the city and the accompanying danger. The children will be under the supervision of public school teachers.—*Pro Infantia*, Madrid, 1931, No. 185.

# Practicability of Epidemiological Methods in the Control of Syphilis\*

WILLIAM L. MUNSON, M. D., F. A. P. H. A.

*District State Health Officer, Granville, N. Y.*

THE problem of the control and eradication of syphilis seems to me to be one of the easiest ones we have in public health, providing we approach the problem with the attitude of mind and with methods similar to those used in the control of other communicable diseases.

I do not want to be misunderstood as to the value of education in any phase of public health work—I am a great believer in it—but so far as syphilis is concerned, I think that our publicity and education have far outrun and overrun our attempts at the practice of hard-boiled epidemiological methods of control of the disease. As an example, to be perfectly frank, I cannot see the value of special talks to school children on gonorrhea and syphilis and what is to be accomplished. I believe in proper sex education but it seems to me that this can well be done by the teachers and parents themselves.

The control of syphilis, as I see it, is predicated upon three very definite and distinct factors; as it were, it rests upon a tripod supported by three legs:

1. Reasonably early and accurate diagnosis
2. Early and proper treatment
3. Sole leather epidemiology

Early diagnosis which is accurate is the keystone of the control of any communicable disease. You must know what you are to control before you know how to control it, and you must get started with that control before the thing is spread all over creation.

There is an increasing tendency, I fear, among public health folk to minimize the value of good clinical medicine. I feel that perhaps some of the newer men going into public health are missing this altogether. Just recently I caught the beginning of a small sized smallpox epidemic by recognizing an atypical case of smallpox. This diag-

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\* Read at a Joint Session of the Health Officers and Epidemiological Sections of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 17, 1931.

nosis was confirmed by the distinguished chairman of the section on epidemiology.\* This early recognition of an atypical case permitted us to get 3,000 people vaccinated almost before some of the typical cases which were contacts began to come down.

Regarding the second standard of the tripod, the question of adequate treatment seems to me quite well taken care of. So far as my experience is concerned I have never seen any lack of facilities for the treatment of syphilis. Adequate treatment is certainly available in New York State.

The question of sole leather epidemiology is the one about which I wish to speak. Apparently from statistics we are really not gaining much headway in the eradication of syphilis. It occurs to me that our failure to control this disease is quite definitely due to the fact that the cases are not properly investigated along practical epidemiological lines.

May I preface some narratives which I wish to give you by stating what may be my feeling concerning epidemiologists and epidemiology?

An epidemiologist is that creature who curiously combines a reasonable scepticism and insatiable curiosity with a passion for the truth and has the ability to recognize the truth when it looks him in the face, and with all this has the initiative to apply sufficient sole leather to the job to get the facts.

The object of epidemiology is to know enough about the behavior of a given disease and a given disease situation to control it. While it may be fun to exercise the mind playing with speculative and hypothetical epidemiology, this pleasurable exercise must be subservient for the most part to the practical. I take it that the taxpayers want us to get as much joy as possible out of our work but that probably that wish is secondary in their minds to putting down outbreaks of communicable disease and particularly in controlling these outbreaks so that their own communities are free from these diseases.

Having viewed for some time the passing scene in public health I have come to a fairly well settled feeling that epidemiologists are made by God and that the man-made type are worth in the market just what they will bring as good clerks.

The true epidemiologist or medical detective, when he has the scent, is perhaps the most stubborn being that you can imagine. He ariseth in the chill of morning and he toileth away into the night.

If we are going to control syphilis we must go to work instead of talking about it. Going to work on syphilis means the same as it does with typhoid fever—epidemiology. Each case must be worked up.

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\* Dr. Edward S. Godfrey, Director Division Communicable Diseases, New York State Department of Health.

If every case of syphilis were investigated and proper attention paid to the contacts as is done in other diseases, it would not be very long before medical students would have difficulty in obtaining clinical material enough for instruction in this disease.

The trouble with the whole business is that we have not made a real attempt to eradicate the disease. We have played around a good deal with it but sometimes one is forced to wonder just how seriously we have made war. We have probably talked more about syphilis without action than about any other disease in the reportable list.

In doing the epidemiology of this disease, one must be bold, determined, and unafraid. What constitutes good epidemiology in syphilis? I certainly would not be bold enough nor have the temerity to suggest that the following narrative reports may be such but I offer them as something which may point the way to the direction in which we should go.

Apparently syphilis is susceptible to very accurate tracing. The epidemiology for the most part is no more difficult and involved than smallpox. I presume that the difficulty has been with us in that we have, when investigating the disease, failed to speak out boldly with our questions and to proceed with our investigations with the same diligence that we would in typhoid. The reason for this, I believe, is obvious—we are too delicate.

Let me relate some investigations:

#### EPISODE 1

The first intimation which the New York State Department of Health had of anything being wrong in this community was when a Sunday school teacher came to the Director of the Division of Social Hygiene and stated that the wife of a certain official in her community was "dosing my boys with a bad disease." This information was passed on to me, the feeling, I think, being that it was based upon some sexual complex of the complainant.

One day when going through this town I stopped and talked to the Sunday school teacher and became convinced of the honesty of her suspicions and also of their validity. As a result of this interview I made an investigation which uncovered more than even the complainant had suspected. The Wassermanns for the community were checked up. There were a large number, 17 positives, all under fictitious names, but almost all of them taken by one particular doctor.

This doctor was called upon and with some of the information which I had in hand I convinced him that I knew quite a bit about the situation. He then became a fountain of information concerning the cases.

The first lead was to the station agent of the community. The story of this rather prosaic man was interesting and a little pathetic. He had been infected with syphilis by the wife of the official. The station agent was one of two men then "keeping company" with a school teacher; this teacher became infected from



the station agent and then married the other man. The teacher passed this acquired syphilis on to her innocent husband, who, when I saw him, had not the slightest idea that he had syphilis although he had a mouthful of mucous patches at the time. The teacher became pregnant and miscarried a syphilitic fetus. She was outside of the hometown in another community teaching when her secondary lesions developed. The diagnosis was German measles and she was kept under isolation until the first physician in her hometown, who had all the other cases, made the correct diagnosis.

The information which I received from the doctor concerning the names of the persons affected and who had the positive Wassermanns disclosed upon investigation that their infection was unquestionably the same source, that of the wife of the public official.

It was found that this woman was unquestionably about as promiscuous as it was humanly possible to be. My own opinion is that she was probably a nymphomaniac.

There were many sidelights of interest from the viewpoint of human psychology, such as the unquestionable, but perhaps difficult to prove, fact that this woman took her 15 year old daughter as a companion on some of her escapades; also the attempt of the husband to compel his wife to cease her immoral actions even to the point of horse-whipping her.

The woman and her husband, the latter now suffering complete necrosis of his nasal bones, had failed to continue treatment. This I ascertained by investigation with a physician in a nearby city who I suspected might be their attending physician.

It became my duty to go to this official, tell him the whole story which I had found out, and which he denied like a gentleman, meanwhile asking me to talk with his wife. I declined to do this but did state to the husband that he and his wife must get under treatment and stay under treatment and that she must cease passing syphilis about the community and if I found a fresh case of syphilis coming from her I would forthwith proceed to make complaint before the county judge and would have her locked up.

The result was that we got all of the contacts under treatment; the man and his wife went back to their attending physician; and now after quite a lapse of time I have heard no more of syphilis in this community.

## EPISODE 2

In this community several positive Wassermanns were being reported. These occurred among persons who were working for a certain concern. In investigating any disease there are two sources of great information: one is the postmaster, and the other is the station agent. The latter was interviewed in this connection and I asked him where the boys were getting into trouble. He knew the answer, and told me the name of the woman, under pledge of great confidence. I sought this person out and found her with syphilis. A Wassermann was taken which was four-plus. Eleven cases were traced to this person. It was apparent to the health officer and myself that she would be very difficult to handle, and so without any further gestures we appeared against her in court, where evidence was submitted of her activities and infection, and the judge upon the evidence presented committed her to Pavilion G of the Albany Hospital until such time as she would no longer be a danger to the public health. Some time has elapsed since the circumstances de-

tailed here and no more syphilis has been traced to the woman in question or known in the community.

### EPISODE 3

Two young girls came to the doctor in a vacation area and consulted him about their "cold sores" which could not be cured. The doctor was a very knowing and canny one and became suspicious promptly that the "cold sores" were the primary chancres of syphilis. Both girls were virgins. Here is the story:

Inquiry showed that these girls had both been kissed by the chauffeur of a family summering in the community.

Our investigation of the chauffeur showed him with a mouthful of mucous patches. He at first stated he would not say where he acquired his infection. One does not need to be too gentle in these investigations. Inquiry finally placed the source of the infection as a certain woman in town, who was then investigated. She was very indignant and vehemently inclined to resent the intrusion into her private affairs. Her denials and protestations of innocence were so intense and great that I thought she needed more investigation. She was found to have a positive Wassermann and was then given the choice of telling me or telling the judge the men who might probably be infected from her. She finally became convinced that her best interest lay in telling the truth. Two other men were found infected with syphilis. All of the persons, except herself, were cared for by private doctors; she was sent to a clinic in a nearby city, where she was treated. No further cases were ever traced to her.

### EPISODE 4

Just as collateral information might I tell the following? Some years ago a mother inquired why her two girls, 7 and 9 respectively, had to "go to the toilet so often." I responded that they might have some infection and she inquired what, to which I replied, "gonorrhea." The mother abused me profoundly and at length. However, a little later she produced the two children at my office. Both had a positive gonorrheal smear and were virgins. I advised the woman, who was the wife of a farmer who employed three hired men on his farm, to have her husband examine these men. The husband proved to be a weak-kneed fellow and would not follow this request, so the mother herself made the examinations and found one man with a discharge which proved to be gonorrhea.

This fellow was a recent emigrant from Ireland where he said the story was believed that "if a man with the disease could touch parts with a virgin, the disease would disappear into the air." The judge who heard the case gave him 40 years.

### EPISODE 5

The following investigation was made by Dr. John A. Conway, a confrere and brother District State Health Officer in the New York State Department of Health. Thirteen cases of anal chancre were reported in college boys. It was only after several weeks of questioning that the source of infection was found. After a good deal of hammering one boy eventually admitted relations with a young colored chef employed at the dormitory of one of the colleges. This chef, by the time the information was obtained, had departed for parts unknown.

The matter was then reported to the District Attorney, who secured an indictment, the chef being found and apprehended cooking at a boys summer camp. He

was arrested and sentenced to Elmira Reformatory for an indefinite period and later transferred to Matteawan Prison where he is still confined. This colored boy, 23 years old, was always neat and well dressed. He was popular with the boys at the university, and he was the only colored person in the village.

In but one instance did he give any money and that was to a farmer boy who delivered vegetables to the college, the amount being \$.25 each time. It might be noted that this boy was the only one of those infected who might be classed as sub-normal mentally, the others being normal college students.

Just as a sidelight to this report might be presented the fact that a minister was present at the trial who was interested in the colored boy and could not be convinced of his dangerous criminal tendencies and that his condition was mentally abnormal. This well meaning cleric declared that if they would liberate the boy in his custody he would be responsible for his good behavior.

Persistent questioning—almost third degree, if you will—finally after 2 months of effort produced the truth.

#### EPISODE 6

A married man consulted me for a discharge which showed gonococci. He insisted that it could not be a specific infection, but of course I had the actual proof and it could not be disputed. He then told me this story. He and his wife had for a long time been promiscuous, but due to the fact that the children were growing up they decided that it was a poor family policy and so had pledged themselves to the abandonment of extra-marital relations. But he claimed his wife had not kept faith.

A few nights after that the wife consulted me. She had a positive smear; she was told that she had a specific infection; and then she stated to me the same story exactly that the husband had given me, with the remark, "The men are all alike—you cannot believe them on their oath."

Both parties seemed to me to be so utterly honest in their denunciation of the other and there was something in their stories which appealed to me as being the truth that I persisted with my inquiries. On one occasion, while questioning the woman, I said to her, "When were you last pregnant?" This made her obviously a little uneasy. I could see that she flinched and did not care to answer. The questions further persisted in this direction discovered the fact that about 3 weeks before that she had been supposedly a couple of months pregnant and had gone to an abortionist whose name she gave and I believe as a result was infected with gonorrhea. I knew the methods of operation and technic used by the man who did the job. He used a probe which passed from one client to another without sterilization.

#### EPISODE 7

The fact of venereal disease being carried from place to place and starting up little local outbreaks is in my opinion the means of keeping up the rate. The following relation of facts unquestionably has been duplicated many, many times.

An Uncle Tom's Cabin company came to a community about which I know and played a one night's stand. The result of this was 1 case of syphilis and 3 cases of chancroid. These were personal patients of mine. The case of syphilis was in a married man and the disease was passed on to his wife without her knowledge. She never consulted me but I have understood that she was under treatment

for syphilis without her knowledge of what she had. This man acquired his disease from the person who portrayed little Eva.

In addition, to my personal knowledge, there were 4 other cases of chancroids and all of these men had acquired their disease from a colored woman in the show.

These 4 cases occurred in my practice when I was one of six practitioners in the community. It is fair to assume that there were many other cases as a result of Uncle Tom's one night stand in the community. If the cases had been promptly reported and epidemiology done on each no one knows how much suffering and how much disease would have been prevented.

The outstanding element which contributed to the solution of the problems here narrated is determination, with a dash of boldness. Public health is in spots becoming so diplomatic and so tactful that one becomes a little suspicious. Perhaps we must forget some of our polish and get a little push into the business.

Rural syphilis, I believe, for the most part is a series of local outbreaks, such as I have described.

There is just one conclusion: Every case of syphilis should have a hard-boiled, determined, and bold epidemiological investigation.

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## The Lady of Godey's: Sara Josepha Hale

THE life of Sara J. Hale, who has been dubbed "The Lady of Godey's," is the subject of a book recently published by Lippincott, and reviewed at length in the *New York Times Book Review* for November 22, 1931. The magazine carrying the name of Godey was known to everyone who read at all, but this biography has reminded us of matters which had certainly escaped the memory of almost everyone. It shows that Sara Hale was a pioneer in many matters for which the professors of hygiene and public health workers now take credit, and which are usually considered very modern. Articles on physical culture and child hygiene, as well as those on housekeeping, home making, architecture, gardening, cookery, etc., appeared 60 to 75 years ago, due to the farsightedness of "The Lady of Godey's." About 1850 the magazine had attained an unprecedented circulation of 150,000 copies, and there can be as little doubt of its influence in regard to health matters as there is in regard to the general subjects which it covered, including, as it did, an amazing number of reforms and innovations, such as the adoption of Thanksgiving as a national holiday, women as teachers in the public schools, women medical missionaries, Seaman's Aid Society, day nurseries, and public playgrounds.

While we give all honor to this pioneer, let us thank the author, Ruth E. Finley, for her painstaking study, which has brought to light the health facts which had apparently been forgotten by the few living who knew them, and are new to the present generation.

# Syphilis from the Epidemiologist's Point of View\*

THOMAS PARRAN, JR., M. D., F. A. P. H. A.

*New York State Commissioner of Health, Albany, N. Y.*

THAT much is unknown about the epidemiology of syphilis is apparent even to the casual student of the disease; yet syphilis seems to excite the interest of few epidemiologists here or abroad. The extension of knowledge in the epidemiology of the disease and the better application of existing knowledge are the next steps most needed in control.

Although the origin of syphilis is clouded in obscurity, there is no disease around the history of which there has been raised such a storm of controversy. Because syphilis spread throughout Europe in the last years of the 15th century and the first years of the 16th, many students have concluded that it was imported by the sailors of Columbus on their return from their voyage of discovery. The disease, however, was described before 1492 in Europe and in the ancient writings of the Chinese and Japanese reference is made to a disease which undoubtedly was syphilis. The weight of evidence discredits the American origin of syphilis, although it is certain that about the end of the 15th century this disease spread rapidly over the whole of Europe. In many instances it took on the character of an ordinary communicable disease. The reason for this widespread prevalence has been discussed at length by Hirsch,<sup>1</sup> who summarizes the evidence which leads him to conclude that syphilis existed prior to the return of Columbus's sailors from their voyage of discovery. Sudhoff<sup>2</sup> and Garrison<sup>3</sup> also have reached the same conclusion after exhaustive investigations.

## THE CAUSATIVE ORGANISM

To say that the causative agent of syphilis is unknown appears to be rank heresy, so generally is the *Treponema pallidum* accepted as the inciting agent, although Koch's postulates have never been fulfilled as regards this disease.

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\* Read at a Joint Session of the Health Officers and Epidemiology Sections of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 17, 1931.

*Cultivation*—The *T. pallidum*, in my opinion, has never been grown on an artificial medium outside of the human body, in spite of thousands of attempts by the most competent bacteriologists in the world.<sup>2</sup> A few reports of success in the cultivation of organisms, which on sub-culture prove invariably to be non-virulent, probably represent accidental contaminating saprophytic spirochetes. The evidence is far from conclusive that the *T. pallidum* is the sole etiologic agent. Questions which remain unanswered concerning the cause of syphilis are:

1. Is the *T. pallidum* alone the causative agent? if so, is the visible spiral form but one stage in the life cycle? or
2. Is there an "x-factor," the presence of which is necessary as a symbiont with *T. pallidum*? or
3. Is the true causative agent unknown, and the *T. pallidum* a saprophytic concomitant of the true cause?

Certain it is that during the period of incubation of the infection in rabbits one may search diligently through innumerable microscopic fields and fail to find a single organism; yet the inoculum will produce the disease.

*Life Cycle*—A number of investigators have reported a life cycle, during which the organism passes through an ultra-microscopic stage, and during recent years Levaditi<sup>3</sup> has revived this idea and has described various developmental forms. Warthin<sup>4</sup> also leaned toward this view.

*Physical Characteristics*—The organism is fragile; it does not resist drying; there is no reservoir of infection so far as is known outside of the human body. It is very susceptible to heat, to soap and to chemicals.

*Strains*—Much discussion has arisen as to whether or not there are special strains of the *T. pallidum*. In the case of other organisms differences in strains are demonstrable, and *a priori* it seems logical to assume that they exist in this organism.<sup>5</sup> Evidence which is suggestive but not conclusive has been accumulated indicating that there are special neurotrophic and dermatrophic strains and that the higher rate of involvement of the nervous system among some peoples is a result of infection with a neurotrophic strain.

#### RELATION OF YAWS AND SYPHILIS

It is uncertain whether or not the disease called "yaws," prevalent in the tropics, is a modified form of syphilis. The weight of experimental results points to a difference in the two diseases, while Butler<sup>6</sup>

has presented suggestive epidemiological evidence of their identity. It is still unsettled whether or not an infection with "yaws" prevents the development of syphilitic infection. The only direct experiments in humans are those of Jahnel and Lange,<sup>7</sup> who failed by inoculation to infect two general paretics with a yaws virus although one normal subject took the disease.

#### RESISTANCE TO INFECTION

*Natural Resistance*—There appears to be no natural resistance to an initial infection with syphilis, although Coutts,<sup>8</sup> after citing the virulence of syphilis when introduced into a virgin soil, has suggested the possibility of widespread sub-clinical infection with an attenuated virus, which partially immunizes a large proportion of the population and results in a comparatively mild form of the disease. Also if Warthin's<sup>9</sup> findings which showed the *T. pallidum* in tissues of from 35 to 50 per cent of the autopsies at the University of Michigan Hospital are accepted, our present conceptions of syphilis must be changed. On this basis, infection with the *T. pallidum* must be considered a widespread condition in which only the occasional case comes above the horizon of clinical and serological recognition.

The unbroken skin presents a barrier to the passage of the *T. pallidum* but the mucous membrane apparently does not. Susceptibility to infection appears to be universal except in persons already infected. Once the disease has established itself in the body, its course may vary greatly. Constitutional factors as yet unknown seem to determine the severity of the infection and the susceptibility of the central nervous and cardiovascular systems to involvement. Differences in type of the disease are shown by some races. The dark skinned races are more resistant to involvement of the nervous system, while the negro is more susceptible to cardiovascular disease of syphilitic origin.<sup>10</sup> Sex is an important factor in the course of the disease as well as in its prevalence.<sup>10, 11</sup> Pregnancy seems to exert a specific beneficial effect in promoting latency.

*Acquired Immunity*—Second attacks in themselves are no different from initial attacks. It is well known that second infections with syphilis are of rare occurrence, and as criterions by which infection is judged become more severe, the number of proven cases is reduced almost to the vanishing point.<sup>12</sup>

Following Neisser's<sup>13</sup> work it was thought that this resistance to a second infection was due to persistence of the first, and that susceptibility reappeared when the first infection was eradicated. In recent years, however, Chesney<sup>14</sup> has shown that immunity to a second in-

fection is not dependent upon persistence of the first, but rather upon the length of time elapsing between onset and sterilization. In experimental animals he finds that a certain degree of resistance to re-infection is acquired if the initial infection is allowed to run its course for a few months before the animal is sterilized. This immunity to re-infection is complete to a homologous strain of the *T. pallidum* but is partial only to a heterologous strain. Immunity does not develop if treatment is started early in the course of the disease. The infection in the rabbit can be cured either in the early or the late stage. Animals cured of an initial infection may show different degrees of immunity depending upon many factors, including the length of time the disease was allowed to run its course.

This resistance may be:

1. *Complete* to any subsequent re-infections
2. *Partial*, with the result that subsequent inoculations do not produce any local lesions at the point of inoculation, yet the virus spreads throughout the body and produces a generalized infection
3. *Absent*, the animal being susceptible to re-infection following the first attack of the disease, the second running the same course as the initial one

This partial immunity has a striking significance in regard to the epidemiology of syphilis.

The immunity which develops during the course of syphilis apparently is not a humoral immunity. Antibodies have not been demonstrated. It seems to be a cellular immunity which may be sufficient to prevent any subsequent infection, or to prevent the development of a lesion at the point of entrance, but not sufficient to protect against dissemination of the virus in the body. The whole subject of immunity in syphilis has been reviewed in recent years by Chesney," Harrison," and Brown."

If these degrees of immunity develop similarly in the human, it is likely that many of the cases in which signs of the disease reappear after the lapse of years may be second infections with no local lesions. In other words, the patient who is treated thoroughly and reexamined for years with negative findings, but who ultimately develops signs of cardiovascular syphilis or other late symptoms, may indeed have been cured of his first infection but have been re-infected without an initial lesion. Because of the known tendency of the disease to become latent, syphilologists have established rigid criterions of cure. Are these too severe, and are many cases being overtreated because a second "blind" infection is mistaken for reactivation of latency?

The immunity which develops in the course of syphilis apparently



is interrupted by early arsphenamine treatment. In fact, Bruck in Norway always advocated a policy of "masterful inaction" in the treatment of syphilis, maintaining that all anti-syphilitic remedies depressed the natural immune processes. Recently Bruusgaard<sup>18</sup> has attempted to follow up the patients treated by his teacher Bruck. The results, while not conclusive, indicate that the percentage of general paresis and cardiovascular syphilis is no higher than among patients better treated.

Public health considerations, however, make it impossible to follow such a policy generally. Moreover, if treatment can be started in the sero-negative primary stage, the chance of cure is nearly 100 per cent (Harrison,<sup>19</sup> Moore<sup>20</sup>).

*Onset and Duration of Infectiveness*—Though the onset of syphilis characteristically is with an initial lesion and a secondary rash, no history of these symptoms can be obtained in a considerable proportion of males and in a large proportion of females. Infection may occur with no recognizable initial lesions. There are no criterions by which cure can be determined, and the patient may show late effects of the infection after the lapse of years during which all signs of the disease are absent.

Characteristically tending to latency, the syphilologist is puzzled in many late cases as to whether he should upset the symbiotic relationship existing between the organism and the invaded tissues by vigorous treatment which may in itself impair vital organs; or whether by "masterful inaction" he should risk an infectious relapse with the consequent public health danger, and the development of late lesions as a result of inadequate treatment.

Infectious by sex contact and to some extent by casual contact when open lesions are present, some recent studies tend to confirm clinical observations that the seminal fluid of syphilitics may be infectious for years with no macroscopic open lesions on the skin or mucous membranes.

*Chronic Carriers*—It is uncertain whether syphilis is a curable disease in the sense that every organism can be eradicated from the body with no possibility of relapse.

In syphilis it is well known that a considerable percentage of cases have a tendency to relapse and develop infectious lesions. A comprehensive study of cutaneous and mucosal relapse by Stokes<sup>21</sup> and a collaborating group among 5,952 cases of early syphilis revealed 360 cases which relapsed after original lesions were healed. If in the most expert hands 6.5 per cent of cases relapse, the number in the average clinic and in general practice must be much larger. A committee of

experts assembled by the League of Nations in 1928 outlined as the next most needed step to secure added knowledge of syphilis a study of the results of treatment in various countries.<sup>27</sup>

The most pressing problem in the therapy of syphilis is: Can syphilis in fact be cured? and if so under what conditions? Do our best attempts consist merely in creating a symbiotic relationship between the organism and the tissues, causing no obvious symptoms in a majority of cases but potentially capable of reactivation and infectiousness?

#### PREVALENCE

It is probably easier to exterminate syphilis in a population than to determine its exact prevalence and distribution. Here is a disease in which the time of onset frequently is obscure; the infection often does not rise above the horizon of clinical recognition; a positive Wassermann test may be the only sign of its existence; even a negative Wassermann is no assurance that the infection has been eradicated; and there is no accurately demonstrable end-point.

Statistics as to the absolute amount of syphilis in a population always will be inaccurate, due to:

1. The unknown percentage of cases which are never diagnosed or treated
2. The frequent absence of definite signs of onset
3. The impossibility of determining whether or not the disease has terminated in a given case
4. The reticence of patients and physicians in notification of cases

One can discuss minimum rates, however, in terms of the number of cases constantly under treatment and the attack rate of treated cases. From these rates, plus a knowledge of the age distribution of the population and the age of onset of syphilis, one can determine specific attack rates by age groups and can estimate the percentage of the population which at some previous time has experienced an attack of the disease.

*Cases of Syphilis Constantly under Treatment*—During the past 5 years studies made by, and in coöperation with, the U. S. Public Health Service<sup>28</sup> by the 1-day census method in a population totaling 25,822,137, and typical of the population of the country as a whole, reveal 110,039 cases of syphilis constantly under treatment. This represents a prevalence rate of 4.26 per 1,000 inhabitants, and means that more than a half million people in the United States are constantly under treatment because of syphilis. Rates for certain of the areas are given in Table I.

TABLE I

RATES PER 1,000 POPULATION OF CASES OF SYPHILIS UNDER TREATMENT IN CERTAIN  
LOCALITIES SURVEYED IN THE UNITED STATES CLASSIFIED  
BY STAGE OF THE DISEASE\*

LOCALITY	Total		Early		Late	
	Cases	Rate	Cases	Rate	Cases	Rate
Tennessee (34 counties)	6,323	4.42	2,438	1.70	3,885	2.72
Oregon	2,104	2.40	609	.69	1,495	1.70
Detroit	8,574	6.22	2,898	2.10	5,676	4.12
Mississippi (16 counties)	2,225	3.99	959	1.72	1,266	2.27
Cleveland	6,935	6.03	2,581	2.24	4,354	3.78
Virginia (18 counties)	4,753	3.97	1,775	1.48	2,978	2.48
Iowa	2,990	1.23	1,244	.51	1,746	.72
City of St. Louis and 5 counties	8,293	6.44	2,386	1.85	5,907	4.59
New York State (excl. N. Y. C.)	14,476	2.63	4,139	.75	10,337	1.88
Philadelphia	9,082	4.40	2,702	1.31	6,380	3.09
New York City	29,423	4.90	7,064	1.18	22,359	3.72
14 Communities	4,115	6.71	1,428	2.31	2,727	4.40
Total	99,333	4.05	30,223	1.23	69,110	2.82
Philadelphia, Pa.	9,082	4.4	2,702	1.3	6,380	3.1
Baltimore, Md.	7,462	9.3	1,393	1.7	6,069	7.5
New Orleans, La.	2,676	5.8	1,036	2.3	1,640	3.6
Charleston, W. Va.	1,024	17.0	(a)	(a)	(a)	(a)

\* Data from U. S. Public Health Service Records.

a. Data by stage of infection were not available for the Charleston City Clinic, which reported 45 per cent of all the cases.

The rates vary from 17.0 in one city of 60,000 to less than one per 1,000 in certain rural areas.

*Annual Attack Rate*—Estimates may be made of the annual attack rate from the number of cases found under treatment by the 1-day census and the known turnover of clinic patients. More accurate information is had from a census of new cases which are diagnosed for the first time during a 1-month period. This is available for up-state New York, for 4 large cities, and for 14 additional communities in 6 states, and is presented in Table II.

If the single months during which the census was taken are typical, then there is an indicated annual attack rate of 7.3; divided into early and late syphilis the indicated rate is 3.4 and 3.9 per 1,000, respectively.

If it is assumed that all of the "late" cases, in spite of the physicians' statements to the contrary, had been registered for treatment elsewhere prior to the census, the attack rate of cases which acquired their infection within the preceding year and came for treatment promptly certainly represents a minimum.

TABLE II

ANNUAL ATTACK RATES FOR SYPHILIS ACCORDING TO STAGE OF DISEASE AT TIME OF DIAGNOSIS FOR VARIOUS COMMUNITIES

Name of Community	Population	Estimated Cases * and Annual Attack Rates					
		Total Cases	Rate	Early Syphilis Cases	Rate	Late Syphilis Cases	Rate
Philadelphia, Pa.	2,064,200	19,344	9.4	7,980	3.9	11,364	5.5
Baltimore, Md.	804,874	8,560	10.6	3,972	4.9	4,588	5.7
New Orleans, La.	458,762	6,528	14.2	3,744	8.2	2,784	6.0
Charleston, W. Va.	60,411	2,964	49.1	1,440	23.8	1,524	25.3
14 Communities (Resurvey)	654,581	8,604	13.1	5,592	8.5	3,012	4.6
Upstate New York (Resurvey)	5,786,389	25,524	4.4	10,752	1.8	14,772	2.6
Total	9,829,217	71,524	7.3	33,480	3.4	38,044	3.9

\* Based on cases seeking treatment for first time during a 1-month period.

For every 100 cases constantly under treatment in these communities there were 173 new cases which were diagnosed for the first time during the preceding year, of which 83 were early cases. Applying to the whole country this same ratio to the surveyed cases under treatment in the population of 26,000,000, it is estimated that in the United States 871,000 cases of syphilis are diagnosed for the first time each year and that of these cases 408,000 are early syphilis.

*The length of time patients are treated* is indicated by these ratios,

TABLE III

CASES OF SYPHILIS CONSTANTLY UNDER TREATMENT AND RATES PER 1,000 POPULATION FOR CITIES IN DIFFERENT POPULATION GROUPS

GROUPS OF CITIES	Population	Cases	Rates per 1,000 Population
13 cities over 100,000 (a)	13,699,514	80,734	5.89
7 cities 50,000 to 100,000 (a)	464,929	3,292	7.08
8 cities 10,000 to 50,000 (a)	217,897	2,869	13.16
Total (a)	14,382,324	86,895	6.04
6 cities over 100,000 (b)	1,472,443	7,064	4.80
6 cities 50,000 to 100,000 (b)	435,493	1,753	4.03
56 places 10,000 to 50,000 (b)	1,065,535	3,374	3.17
Total (b)	2,973,471	12,191	4.10

a. Data from U. S. Public Health Service Records.

b. Data from survey of upstate New York, May 1, 1910.

from which it appears that on the average syphilis patients remain under treatment  $6\frac{1}{2}$  months.

*Urban vs. Rural Rates*—The rates of cases under treatment by communities of different population groups are summarized in Table III. In one group of 13 cities, surveyed by the U. S. Public Health Service, of over 100,000 the rate varies from 4 to 13.3 with an average of 5.89 per 1,000; in 7 cities of 50,000 to 100,000 the rate varies from 1.1 to 12.0 with an average of 7.08; in 8 cities of under 50,000 the rate varies from 5.7 to 31.2 with an average of 13.16.

A study of the rates for cities of different sizes in up-state New York where the population is rather uniform and where other influencing conditions are practically the same for all the communities is shown also in Table III. The attack rate in a general way varies with the size of the city, the larger the city the higher the attack rate. However, it should be pointed out that whereas the rate varies with the size of the community when grouped as above, a detailed study of cities shows no direct correlation between attack rate and density of population. The cities studied by the U. S. Public Health Service were widely scattered and the proportion of colored and white population probably was unequal in the three groups. This and other variables probably account for the wide variation in the individual groups.

#### STAGE OF THE DISEASE

Of more significance than the total rate are the rates of early cases in which the infection was acquired within 1 year from the date of survey. Early cases under treatment constitute 30 per cent of the total (Table IV). The considerable variation found in the percentage of early and total cases in different communities may be due to a

TABLE IV

PREVALENCE OF SYPHILIS BY STAGE OF THE DISEASE AND SEX OF THE PATIENT IN COMMUNITIES SURVEYED, SHOWING THE RATES PER 1,000 POPULATION

Syphilis						
Stage of the Disease	Number of Cases *			Rates per 1,000 Pop.		
	Total	Male	Female	Total	Male	Female
Early	32,954	22,155	10,799	1.28	1.70	0.84
Late	77,085	45,710	31,375	2.98	3.51	2.46
Total	110,039	67,865	42,174	4.26	5.21	3.30

\* Exclusive of the Charleston City Clinic cases for which data by Stage of Infection were not available.

declining attack rate; a variation in the delay in seeking treatment; or differences in the effort to keep cases under treatment.

#### TREATMENT

*Time Treatment is Started*—From other sources<sup>21</sup> exact data are available as to the interval between the onset of the disease and the beginning of treatment. Among those patients who seek treatment during the first year, only 11 per cent (204 in 1,734 cases) begin their treatment in the sero-negative primary stage or during the first few weeks when possibility of eradicating the disease is greatest. Another 22 per cent seek treatment for the first time during the primary stage but after the blood Wassermann has become positive, while the remainder, two-thirds of the total, have fully developed secondary lesions before seeking medical care. Expressed in terms of the time which elapses between onset and treatment: one-third of the cases come during the first month; 55 per cent during the first two months; and 37 per cent allow from 2 to 12 months to elapse.

These data deal only with early syphilis and do not include the very considerable number of patients who are diagnosed for the first time during routine examinations, or who seek relief for symptoms years after the onset of the disease. For New York State more than one-half of the males and two-thirds of the females come under treatment for the first time more than 1 year after onset of the disease (both sexes 57.9 per cent). In 18 other communities, including several large cities, less than one-half of the cases coming initially for treatment were classed as "early" syphilis.

Syphilis can never be controlled while more than one-half of the cases are not recognized for more than a year after onset.

*Where Patients are being Treated*—Of the cases in the population of 26,000,000, surveyed by the U. S. Public Health Service, 64 per cent are being treated by private practitioners as private patients, while 36 per cent are being treated in public clinics, hospitals and similar institutions. Forty-one per cent of all of the registered physicians in these areas were constantly treating one or more cases (3,089 physicians in a total of 7,530). The bulk of cases, however, are concentrated in the public clinics and in the hands of very few physicians: 10 per cent of the physicians are treating two-thirds, 5 per cent of the physicians are treating 50 per cent, and 1 per cent of the physicians are treating 25 per cent of the cases. In other words, nearly three-fourths (72 per cent) of all known cases are under treatment by public clinics and specialists; viz., the 5 per cent of physicians who have 12 or more patients constantly under their care.

TABLE V

AGE AT ONSET OF SYPHILIS AMONG 2,227 PATIENTS TREATED IN THE 3 ST. LOUIS CLINICS AND  
IN THE 5 CLINICS PARTICIPATING IN INQUIRY INTO SYPHILIS TREATMENT\*

Ages	Male			Female			Total Cases	Per cent
	Total	White	Colored	Total	White	Colored		
1 to 9	2	1	1	2	2	0	4	0.2
10	3	1	2	3	0	3	6	0.3
11	2	1	1	3	2	1	5	0.2
12	4	1	3	9	4	5	13	0.6
13	3	1	2	15	6	9	18	0.8
14	8	5	3	17	8	9	25	1.1
15	21	10	11	35	14	21	56	2.5
16	35	17	18	54	19	35	89	4.0
17	48	25	23	53	19	34	101	4.5
18	53	32	21	51	23	28	104	4.7
19	81	45	36	56	27	29	137	6.2
20	100	54	46	59	33	26	159	7.1
21	100	62	38	65	36	29	165	7.4
22	92	52	40	57	24	33	149	6.7
23	94	53	41	46	22	24	140	6.3
24	72	42	30	30	14	16	102	4.6
25	80	52	28	36	18	18	116	5.2
26	73	50	23	30	13	17	103	4.6
27	68	47	21	35	19	16	103	4.6
28	69	46	23	18	12	6	87	3.9
29	52	38	14	24	10	14	76	3.4
30	52	34	18	18	9	9	70	3.1
31	41	29	12	12	8	4	53	2.4
32	38	28	10	19	11	8	57	2.6
33	35	26	9	13	8	5	48	2.2
34	22	15	7	9	3	6	31	1.4
35	25	20	5	9	5	4	34	1.5
36	24	15	9	7	5	2	31	1.4
37	17	13	4	3	2	1	20	0.9
38	16	14	2	6	5	1	22	1.0
39	15	10	5	3	3	0	18	0.8
40	11	7	4	4	3	1	15	0.7
41	13	10	3	3	2	1	16	0.7
42	6	4	2	1	1	0	7	0.3
43	8	4	4	2	0	2	10	0.4
44	4	4	0	1	1	0	5	0.2
45	7	3	4	3	2	1	10	0.4
46	4	2	2	1	1	0	5	0.2
47	5	4	1	3	1	2	8	0.4
48	2	2	0	2	2	0	4	0.2
49	3	1	2	1	1	0	4	0.2
50	0	0	0	1	1	0	1	0.04
Total	1,408	880	528	819	399	420	2,227	99.94

\* Data from U. S. Public Health Service Records.

## DISTRIBUTION

*Age Distribution*—Haustein<sup>21</sup> has assembled all available data on age at onset of syphilis for various European countries.

Most of the data on age distribution of cases in the United States deal with the age of patients when the case is reported or at the time treatment is started. A tabulation of the age at onset of 2,227 patients with acquired syphilis, selected from among the clientele of seven large clinics in different states, is shown in Table V.

The peak for the whole group occurs at the age of 21; also for both sexes. However, when divided according to color, the peak for colored females is found at 16 years and for white females at 21 years; for colored males at 20 years and for white males 21 years.

An examination of the percentage infected at the two age periods of 20 and 30 years shows very strikingly that females are infected at a much earlier age than males, and that colored persons are infected earlier than white people (Table VI).

TABLE VI  
PERCENTAGE OF TOTAL CASES WHICH OCCUR BEFORE AGE 21 AND AGE 31

AGE GROUPS	Male		Female	
	White	Colored	White	Colored
Age 1-20	21.9	31.6	39.3	47.6
Age 1-30	76.0	84.0	83.7	90.9

*Sex Distribution*—From the prevalence surveys, complete data are available as to the sex distribution of patients. Of the 110,039 patients, 67,865 were male and 42,174 were female, the disease being roughly 50 per cent more prevalent among males (Table IV). Some of this difference may be due to the larger proportion of female patients in whom the disease is not recognized and treated. In support of this is the fact that males under treatment in the early stages outnumber females more than 2 to 1.

The ratio of female to male cases for different countries, collected by Harrison<sup>22</sup> shows a similar preponderance of male infections.

The prevalence of syphilis among pregnant women is of considerable practical interest because of the splendid results of treatment in insuring healthy offspring. Elsewhere<sup>23</sup> I have summarized all available published reports on this problem which showed an average of 6.5 per cent pregnant women infected with syphilis. These reports were chiefly of maternity hospital and dispensary patients.



*Geographical Distribution*—Syphilis is not evenly distributed in the population, although climate itself apparently is not a factor. The distribution between urban and rural areas is presented elsewhere. More prevalent in the southern states than in the northern and western, even though the increase among negroes is eliminated; almost pandemic in boom towns, with a large floating population; comparatively rare in the more static rural populations of some states, more prevalent among those in the lowest economic groups; it is possible to localize somewhat the problem of syphilis.

*Racial Prevalence*—The prevalence surveys reveal a great disparity between negro and white rates, which is supported by many other sources of information. Among a population of nearly 6,000,000 in which negroes form a considerable percentage of the total, the rate of cases under treatment for white was 4.16 and for negro 10.04, per 1,000 (Table VII). Wassermann surveys of whole negro populations conducted in recent years by the U. S. Public Health Service<sup>21</sup> in a number of representative rural counties in southern states, furnish added evidence of the higher prevalence, averaging about 20 per cent of positive Wassermann reactions in the entire negro population.

TABLE VII

PREVALENCE OF SYPHILIS BY SEX AND COLOR OF THE PATIENT IN ONLY THOSE LOCALITIES WHERE THE SURVEY WAS MADE AS TO COLOR \*

SYPHILIS	Total			White			Colored		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Number of Cases	32,756	19,763	12,993	17,987	11,838	6,149	14,769	7,925	6,844
Rates per 1,000 Population	5.65	6.77	4.51	4.16	5.42	2.87	10.04	10.80	9.28

\* Includes Tennessee, Mississippi, Virginia, St. Louis and 5 counties, Charlestown, W. Va., Baltimore, Md., and New Orleans, La.

*Cyclic Prevalence*—No evidence has been adduced in the United States that syphilis shows a cyclic prevalence comparable with other infectious diseases, except for increases which have followed wars and social changes. In Sweden, a 7-year cycle has been described.

Season seems to have no bearing on the attack rate, although new cases in some clinics increase after the summer and Christmas vacation periods.

## SOCIAL FACTORS

The amount of extra-marital sex intercourse and the efficiency and utilization of medical service determine to a large extent the prevalence of syphilis. The prevalence of the disease is higher among those in the lower economic groups, and evidence from a number of European countries shows a direct relation between economic conditions and syphilis rates. These variations are accentuated by social upheavals such as occurred in a number of countries following the war. The World War resulted in an enormous increase in this disease, which was apparent even in the Scandinavian countries, which were not participants. Alcoholism is another factor which predisposes to exposure and infection.

## TREND OF SYPHILIS RATES

An essential element in judging the success of control efforts, the trend of syphilis infection is difficult to determine. During the past year re-surveys of prevalence have been made in New York State, and in the 14 communities surveyed by the U. S. Public Health Service in 1926-1927, using exactly the same methods in each instance. Detailed data are not yet tabulated for the Service surveys but total cases in the re-survey exceed those found in the initial study.

In 1930 in New York State the total cases under treatment were 15,732, while in 1927 the total was 12,936, an increase of 2,796. The increase was chiefly in clinic cases and in late cases—the early cases being about the same in the two surveys.

Cases notified to the Service, which admittedly represent only a part of treated cases, are not decreasing.<sup>21</sup> In New York State, where current checks are made of all cases diagnosed for the first time in approved laboratories, annual totals show no decline.

Deaths from general paresis and new admissions of this disease to state institutions do not furnish conclusive evidence as to current trends and are complicated by the recently introduced malaria therapy.

Clinicians agree generally that congenital syphilis has decreased. Data from the military forces are inconclusive, with a declining rate in the Army and a stationary rate in the Navy. Space does not permit a discussion of trends and rates in European countries other than the general statement that syphilis increased markedly during and after the war, reaching a peak in 1920 and declining to one-half the 1920 prevalence by 1925-1926. In some countries the rate since then seems to be stationary or on the increase (Harrison<sup>22</sup>), while in others the decline has continued (League of Nations<sup>23</sup>).

Certainly in the United States there is no conclusive evidence that

syphilis is declining. On the contrary, the best evidence available from resurveys of cases under treatment shows a slight increase during the past 4 years.

#### PERCENTAGE OF THE POPULATION PREVIOUSLY INFECTED

A number of students of this problem (Haustein, Jaeger, *et al.*<sup>21</sup>) by a study of annual new cases and known age distribution, have estimated by different methods the per cent of the population at different ages which has experienced an attack of the disease. A fair summary statement is that approximately 20 times the annual attack rate represents the true volume of syphilis infected persons in the community. Haustein has estimated the percentage of persons who between the ages of 15 and 50 have contracted syphilis, varying from 18 per cent in Berlin, to 0.8 per cent for Switzerland. Twenty times the annual attack rate represents for up-state New York a rate of 88 per 1,000; and for the population group given in Table II, 145 per 1,000.

#### EPIDEMIOLOGICAL EVIDENCE OF CONTROLABILITY

Here is a disease in which epidemiological evidence argues for the practicability of control and eradication through direct public health action. Syphilis appears to spread chiefly through a series of localized outbreaks which can be traced to comparatively few determinable sources; the bulk of infection in the white race is concentrated in the cities; most of the cases have a limited period of infectivity; and elimination of infectious sources will have a cumulative effect on the trend.

The existence of an unknown percentage of sub-clinical cases, many of which are infectious, does not in my opinion invalidate the major conclusion. A large proportion of cases are acquired from untreated and inadequately treated cases. These can be recognized by clinical examination and serological tests and can be made non-infectious by treatment.

By these available methods it seems practicable to eradicate syphilis as a public health problem.

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## Manuscripts and Poor English

THE scrutiny of hundreds of manuscripts over a term of years makes us sure of our ground when we allege that at least nine of every ten of them could be vastly improved, as literature, by a critical redaction; and of these many stand in very serious need of such redaction.

Not that the violations of good usage are flagrant illiteracies. The flaws are in such things as poor paragraphing; badly constructed sentences, in which two nominatives get to quarreling with one another; plural relatives with singular antecedents, or *vice versa*; the excessive use of trite words and phrases; the use of the wrong word—"due to" (propositional) for "owing to," "advance" for "advancement," "practically" for "almost," the use of unjustifiable neologisms such as "minify"; the use of orphaned or fused participles; the placing of adverbs; failure to recognize a gerund; and so forward to great diversity. In addition, sentences are frequent which, while they exhibit no specific fault, are awkward stumbling blocks for the reader. They require re-phrasing to recapture fluidity. Often a word, ordinarily good, may be used in an unsuitable context. Often poor word-selection needs correcting.

In brief, we discover that most manuscripts would be measurably improved by the ministrations of a word-smith. You will see exactly what is meant if you recall that a word-smith is a word-smoother. One may say perhaps that the difference is that between a shirt that has been ironed and one that has not. To wear the unironed shirt is entirely decent but not sartorially impeccable. "Homily on Sand in the Sugar," Waverly Press, Inc., Baltimore, Md.

# Syphilis in a Rural Negro Population in Tennessee<sup>\*†</sup>

JAMES A. CRABTREE, M. D., AND E. L. BISHOP, M. D., F. A. P. H. A.

*Director, Division of Preventable Diseases ; and State Commissioner of Health,  
Tennessee Department of Public Health, Nashville, Tenn.*

THE fact that syphilis affords the topic of discussion for this program is evidence of the importance that it is assuming in the minds of public health workers throughout the country—suffice it to say that it is second to few diseases in its effects upon the public health.

While it is well to remember that the venereal disease problem has exercised the minds of those charged with the protection of the community's health since early ages, the varied methods of attack, and the changing points of view afford evidence of the unusually complex and difficult nature of venereal disease control.

Fundamental to the control of any communicable disease is knowledge of (1) its incidence, (2) its modes of spread, and (3) the means of its prevention. Without this basic knowledge, control measures will lack that specificity of approach which is regarded as essential to sound procedure.

As regards syphilis, the first requirement, namely, knowledge of its incidence, is for obvious reasons sadly lacking. It follows that knowledge of the means of prevention is also inadequate since this, at least from the point of view of administration, is in part dependent upon knowledge of the incidence.

It is generally believed that the incidence of syphilis among negroes is considerably higher than that among whites, but we have not had sufficiently accurate information to do more than speculate on the extent of racial difference. Indeed we have had practically no information as to the actual incidence in any unselected group of people, either white or black.

During the past year, the Tennessee Department of Public Health has been making a study of syphilis in a rural group of negro families. The study has had three major objectives:

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<sup>\*</sup> Read at a Joint Session of the Health Officers and Epidemiology Sections of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September, 17, 1931.

<sup>†</sup> This study has been made possible by a grant to the Tennessee Department of Health from the Julius Rosenwald Fund.

1. To determine the incidence of syphilis among an unselected group of negroes of all ages
2. To investigate the effects of syphilis upon the negro individually, and as a family unit
3. To determine to what extent negro personnel can be used in a state-wide program of syphilis control

This preliminary report is concerned primarily with the first objective, the prevalence of syphilis in the entire group. Tipton County, Tenn., was selected for study. It is essentially rural with a population of 27,715, of which negroes number 12,028. The family has been used as a unit of study rather than the individual.

Personnel of the field study unit consists of 2 physicians, 1 nurse and 1 office clerk. All are negroes except 1 physician who has acted as director.

A Wassermann survey of an unselected group was made in the beginning, and all positives were rechecked before they were classed as definitely positive.

#### DISTRIBUTION BY AGE AND SEX

Table I shows the age and sex distribution of positive Wassermanns among the entire group tested.

Of 2,323 individuals tested, 602, or practically 26 per cent, are positive. It is of interest to note that approximately 10 per cent of

TABLE I

AGE AND SEX DISTRIBUTION OF INDIVIDUALS WITH POSITIVE WASSERMANN'S IN A GROUP OF NEGRO FAMILIES IN TIPTON COUNTY, TENN., 1930

Age	Male			Female			Total		
	Total Exam.	Pos.	% Pos.	Total Exam.	Pos.	% Pos.	Total Exam.	Pos.	% Pos.
0-4	58	5	8.6	60	7	11.6	118	12	10.2
5-9	107	13	12.1	124	10	8.1	231	23	10.0
10-14	155	13	8.4	141	15	10.6	296	28	9.5
15-19	182	36	19.7	175	43	24.6	357	79	22.1
20-24	116	37	31.9	145	74	51.0	261	111	42.5
25-29	104	45	43.3	109	51	46.8	213	96	42.2
30-34	63	25	39.7	62	28	45.1	125	53	42.4
35-39	77	28	36.4	80	24	30.0	157	52	33.1
40-44	45	14	31.1	63	26	41.3	108	40	37.0
45-49	47	16	34.0	74	14	18.9	121	30	24.8
50-54	78	24	30.8	48	12	25.0	126	36	28.6
55-59	59	9	15.3	31	8	25.8	90	17	18.9
60 and over	71	18	25.3	49	7	14.3	120	25	20.8
Total	1,162	263	24.4	1,161	319	27.4	2,323	602	25.9

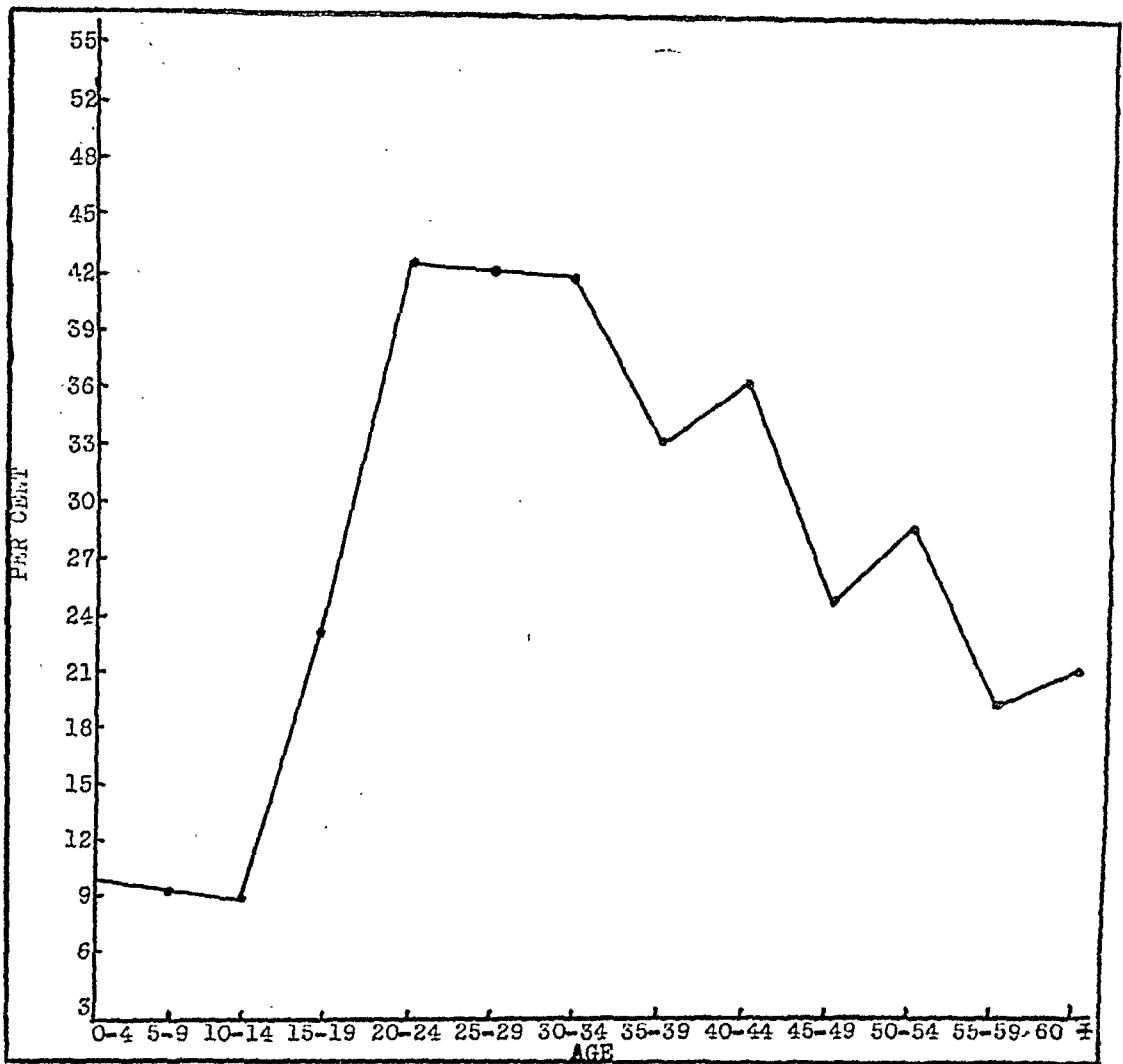


FIGURE I—Percentage distribution of positive Wassermanns in each age group, in a group of negro families, in Tipton County, Tenn., 1930

children under 15 tested were positive. There is no significant difference as to sex—24.4 per cent males and 27.4 per cent females were positive.

Figure II shows the age distribution of the 602 individuals with positive Wassermanns. Of these, 86.6 per cent are between the ages 15 and 50.

Of the 602 with positive Wassermanns, 526 have been placed under active treatment, which allowed a more detailed study than could be made of the entire group during the preliminary survey. The 76 found positive, but not placed under treatment, were those who for various reasons failed to report to the clinics, on account of moving from the county, death, illness, inaccessibility and failure to coöperate.

Of the 526 cases under treatment and observation, 62 are classed as congenital and 464 as acquired. Thirty-seven of the congenital cases are males and 25 females.

TABLE II

AGE AND SEX DISTRIBUTION OF (1) CONGENITAL AND (2) ACQUIRED CASES OF SYPHILIS IN TIPTON COUNTY, TENN., NEGRO GROUP, 1930

Age	Male		Female		Total	
	Congenital	Acquired	Congenital	Acquired	Congenital	Acquired
0- 4	3	0	6	0	9	0
5- 9	14	0	9	0	23	0
10-14	14	0	3	2	17	2
15-19	2	32	5	35	7	67
20-29	2	74	2	110	4	184
30-39	2	47	0	51	2	98
40-49	0	27	0	30	0	57
50 and over	0	40	0	16	0	56
Total	37	220	25	244	62	464

Table II shows the age and sex distribution of both congenital and acquired cases which were placed under treatment following the preliminary survey. Thirty-one of the 37 male congenital cases are under 15 years of age, and 18 of the 25 female under 15. Age and sex distribution of acquired cases does not differ essentially from what one might expect.



FIGURE II—Age distribution of 602 negroes with positive Wassermann, Tipton County, Tenn., 1930



## RACIAL DIFFERENCES IN PREVALENCE

It has been of interest to compare the incidence of positive Wassermanns among the Tipton County negro group with that among a group of white industrial employees in another section of the state of whom a Wassermann survey was made by the State Department of Health during the early part of 1931. The white survey included 1,712 white males, of 15 to 65 years, among whom 4.3 per cent gave positive Wassermanns. This is to be contrasted with the same age group of Tipton County negroes among whom 32.6 per cent were found to be positive, an incidence of almost 8 times that in the white group.

## KNOWLEDGE OF PRIMARY LESION

Each individual found to have acquired syphilis was carefully questioned as regards history of primary lesion. Table III shows the percentage of acquired cases by sex who gave a history of known primary lesion.

TABLE III

SEX DISTRIBUTION OF CASES OF ACQUIRED SYPHILIS ACCORDING TO HISTORY OF KNOWN  
PRIMARY LESION IN TIPTON COUNTY, TENN., 1930

Sex	History of Primary Lesion	No History of Primary Lesion	Per cent with no History of Primary Lesion
Male	130	90	40.9
Female	65	179	73.4
Total	195	269	58.0

Note that 40.9 per cent of males deny knowledge of primary lesion, while 73.4 per cent of females give a negative history, indicating that the likelihood of infection escaping notice by the female is 1.8 times that by the male. It is obvious that too much reliance should not be placed upon the patient's statement with regard to history of primary lesion, so the actual percentage figures may be too large, but it is not unreasonable to assume that the relative percentages as regards sex differences are fairly accurate; considerably more accurate, perhaps, than would obtain among a group of white people.

It was considered of interest to inquire into the history of each case with respect to gonorrhea. Of the 90 males with acquired syphilis, but denying knowledge of primary lesion, 35.5 per cent gave a history of having had gonorrhea. It is possible that in many instances of syphilis in which knowledge of primary lesion is denied, the infection dates from the time of the gonorrhea. However, no particular signifi-

cance can be placed upon this finding, since it is noted that of all the male cases of acquired syphilis, regardless of history of known primary lesion, 37.3 per cent gave a history of having had gonorrhea; and of the total cases, both sexes, 20.5 per cent gave a history of gonorrhea.

#### DATE INFECTION WAS ACQUIRED

Table IV shows the distribution of cases with history of known primary lesion according to time lesion was acquired. Of the 195 cases, 36 or 18.5 per cent acquired the infection within 1 year, and 52.8 per cent within 5 years.

TABLE IV

DISTRIBUTION OF CASES OF ACQUIRED SYPHILIS ACCORDING TO DATE PRIMARY LESION WAS ACQUIRED. NEGRO FAMILIES IN TIPTON COUNTY, TENN., 1930

Date Lesion Was Acquired	Number of Cases	Date Lesion Was Acquired	Number of Cases
Present Year—1930	36	6-10 Years Ago	33
1 Year Ago	18	11-20 " "	28
2-5 Years Ago	49	Over 20 " "	31
Total			195

It affords interesting speculation to apply the foregoing figures to the total colored population of the county, which is fairly representative of the average southern county. On the basis of findings (26 per cent of the total population, of whom 88 per cent are acquired, 18.5 per cent infected within 1 year) it would seem that in 12,000 there are approximately 2,746 cases of acquired syphilis; and on the assumption that the duration of infection does not differ essentially whether or not the patient had knowledge of primary lesion, approximately 508 cases occurred within 1 year, or an annual morbidity rate for acquired cases of 4,233 per 100,000 population.

#### TREATMENT HISTORY

The treatment history of these cases clearly indicates the magnitude of the problem of syphilis control among negroes which faces preventive medicine. Of the 526 cases under observation, only 73, or 13.9 per cent, had received any treatment. Thirteen of the 73 received neoarsphenamine and mercury, with an average of 7 doses of arsenical and 6 of mercury per patient. Thirty-three received neoarsphenamine only, as follows: 16 received 3 doses or less, 13 from 4 to 6, and 4 from 7 to 13 doses. Four patients received mercury only, 22 received oral or mixed treatment, and in 1 case type of treatment was not stated.

One can then appreciate the apathy with which the average negro views luetic infection, and the problems that a mass treatment project will involve. Too, the need for stimulating physicians to a better type of syphilis practice is quite apparent, when one considers the inadequacy of the treatment given when the negro applied for treatment. In less than one-fourth of instances was the patient likely to be rendered non-infectious for any considerable period of time.

#### STILLBIRTHS AND MISCARRIAGES

The relationship between syphilis and stillbirths is well known. Family histories have been obtained upon all families in the study group and Table V shows the number of stillbirths and miscarriages in relation to the presence or absence of syphilis among parents.

TABLE V

STILLBIRTHS AND MISCARRIAGES IN RELATION TO POSITIVE AND NEGATIVE WASSERMANN IN PARENTS, NEGRO FAMILIES, TIPTON COUNTY, TENN., 1930

Condition of Parents	Number of Pregnancies	Number of Live Births	Number of Still Births	Number of Miscarriages	Per cent Pregnancies Resulting in		
					Live Births	Stillbirths	Miscarriages
One or both Pos. Wass.	859	626	77	156	72.9	8.9	18.2
No Positive Wass. in either	243	235	1	7	96.7	0.4	2.9

In families in which one or both parents had positive Wassermanns, a total of 27.1 per cent of all pregnancies resulted in either stillbirths or miscarriages—8.9 per cent stillbirths, and 18.2 per cent miscarriages. This is to be contrasted with the group in which neither parent is known to be positive (with only 3.3 per cent of miscarriages and stillbirths).

Thus, the likelihood of either a miscarriage or stillbirth, when either parent has a positive Wassermann, is 8.2 times that when neither parent has a positive Wassermann—or the stillbirth rate among parents with positive Wassermanns is 123 per 1,000 live births, the miscarriage rate 249.2; among parents with negative Wassermanns, the stillbirth rate is 4.2 and the miscarriage rate is 29.8.

#### SUMMARY

1. A Wassermann survey of a group of negro families in Tipton County, Tenn., has been made.

2. Of a total of 2,323 individuals of all ages tested, 602 or 26 per cent were found to have positive Wassermanns.
3. Eighty-six and six-tenths per cent of these were between the ages of 15 and 50.
4. Of 562 cases placed under treatment and observation, 62 were classed as congenital, and 464 as acquired syphilis.
5. When persons are infected with syphilis, the likelihood that it will not be apparent to females is 1.8 times that of it not being known to males.
6. Of 195 cases giving a history of known primary lesion, 18.5 per cent stated that the lesion was acquired within the past year.
7. Data collected allow for the estimation that the annual morbidity rate for cases of acquired syphilis in Tipton County, Tenn., is approximately 4,233 per 100,000 population.
8. Treatment of cases is shown to be wholly inadequate.
9. The likelihood of a pregnancy resulting in either a stillbirth or miscarriage when either parent has a positive Wassermann is 8.2 times that of such an occurrence when neither parent has a positive Wassermann.

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## Sand in the Sugar

. . . This is, of course, a parable. Sending a manuscript to the type-machines to be transmuted into printed matter when that manuscript is marred with typographical inconsistencies and improprieties is very much like putting a scoopful of sand in the sugar-sack. Ill-advised persons believe that printers exercise some magic by which the blemishes in manuscript are removed. There is no such magic. The sand must be patiently hunted for grain by grain.

Presumably when the author gives "copy" to the printer it is ready to be set into type. The author may say to himself, or even vocally, "They's wunnertwo li'l things in there—but we'll catch that in the proof." The printer knows that in at least nineteen cases of every twenty, there are not merely one or two but many times that number. "But (he may reflect) that's the author's funeral. He's paying for authors' alterations, I'm not. Or if he wansta lettem lie, why should I worry? What's the diff, anyhow?"

And so author and printer enter into a conspiracy to put sand in the sugar—"sand" that, once it gets into type, can very seldom be entirely sifted out. And neither printer nor author thereafter has the privilege of saying what guest shall eat of the feast they have prepared. Any literate person can read their product. Perhaps many of them will not be sensitive to the improprieties. But the most discriminating reader will; and that's the reader that the author particularly (it may be supposed) wishes not to insult.

It is no easier to take the "sand" out of manuscript than it is to take it out of proof. But it is very much simpler to do so and in consequence the doing is more efficacious. And it is very much cheaper, for it can be done, ordinarily, with pen-strokes. The author is serving both his pride and his purse if he has it done in manuscript rather than if he waits until the cost appears in "authors' alterations." "Homily on Sand in the Sugar," Waverly Press, Inc., Baltimore, Md.

# The Control of Syphilis from the Health Officer's Viewpoint\*

N. A. NELSON, M. D.

*Division of Communicable Diseases, State Department of Health, Boston, Mass.*

SYPHILIS has been known in modern history for more than 400 years. In that time it has become, except for the common cold and gonorrhea, among the most prevalent of communicable diseases. The *treponema pallidum* has been known as the causative organism of syphilis for 25 years. The Wassermann reaction has been available as a laboratory aid in the diagnosis of syphilis for 24 years. The arsphenamines have constituted the keystone of anti-syphilitic therapy for 16 years. What other disease would so long have been ignored in the face of so complete an armamentarium! Someone has said that if syphilis were only coughed and sneezed it would have been wiped out long ago.

The *treponema* is delicate and lives only on moist surfaces; there is no intermediary host, the disease being spread from person to person by only the most intimate of contacts; there can be no explosive outbreaks; for control purposes only that part of the population between 15 and 45 years, and especially between 20 and 30 years of age, need be considered; the disease is, in most instances, openly communicable only for a few months at most, even when untreated; the diagnosis is easily made by methods which are readily available and remedies are everywhere at hand which will quickly sterilize the patient.

Yet where are we in the control of syphilis?

Among health officials there are a few who are striving to secure its recognition as a major public health problem. Associated with them are the social hygiene associations and a small group of physicians who are as interested in the control of syphilis as they are in the more technical matter of its treatment. It is the rare city health officer who pays more than passing attention to the incidence of syphilis in his community. Too often it is necessary to plead against his reduction of the next year's budget for the "venereal disease" clinic. In the smaller cities and towns the usual reaction to this enormous

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problem is poorly disguised irritation over the unwelcome responsibility for following up the occasionally reported patient who has lapsed treatment, or the even more rarely reported source of infection.

There are clinics here and there; some worthy of the name, but more often overcrowded; poorly organized; indulging in routine, mass treatment; lacking any semblance of privacy; operating at inadequate and inconvenient hours; and understaffed with a personnel compelled to think in terms of minutes per patient to the exclusion of any intelligent or sympathetic instruction of the patient. Follow-up of delinquent patients, contacts and sources of infection is more often lacking than not, and where it exists it is too often perfunctory, unsympathetic and irritating. Many of the clinics are operated by private hospitals without the least support or even attention from the local health officials, although syphilis is a major communicable disease.

Demand for public information concerning syphilis comes from so few, scattered individuals that almost without exception newspaper editors can safely lean back in their chairs and get away with the fatuous argument that since their reading public must be protected from the unpleasant, they cannot print anything about so indelicate a subject as the "social diseases."

The idealist, sitting safely at his desk, insists that there is no reason why syphilis should not be managed exactly as any other communicable disease. He argues that one needs only to remember that syphilis is a communicable disease and to forget its moral implications, which, in many cases, do not apply. But the health officer who must ring the delinquent patient's doorbell without arousing the curiosity of the family, or who has just advised an examination to an indignant "source of infection," discovers that a natural human desire to avoid discovery of sex irregularity is not so easily brushed aside by an idealistic wave of the hand.

There are excellent reasons why the official program for the control of syphilis should not be as broad as the whole field of social hygiene. Syphilis is but one product of social and sexual ignorance and family maladjustment. If syphilis were to cease to exist tomorrow there would still remain the need for repressing prostitution, for safeguarding morals, for solving the problems of illegitimacy, for providing adequate recreational outlet for youthful energy, and for improving family relationship. Social hygienists have entered the lists against syphilis, first, to set the example to the official agency and second because the more concretely measurable and more immediately remediable part of their problem happens to be communicable disease. The health department which attempts to control syphilis by solving

the fundamental problems of social conduct will not only dissipate its energies to the point of ineffectual thinness, but will soon become discouraged at the slow progress which is being made. It would be as simple to control diphtheria by attempting so to adjust social relationships that the upper respiratory discharges of one person could not possibly reach the upper respiratory tract of another. The control of syphilis is not in any sense dependent upon a social revolution or reconstruction, as is demonstrated in some of the smaller European countries where it is rapidly being accomplished. While the official health agency may well participate in, and give support to, the broader program, its first responsibility is that of applying what is known about syphilis as a disease to its control as a disease.

Among the more important parts of such a program are epidemiology, medical care, public education, and health administration. Underlying these, and essential to the authority of the health department to proceed with its program, is the law.

Almost every attempt at arbitrary law enforcement only adds to the evidence of its futility. Syphilis is easily hidden and easily driven to cover. It is not, like typhoid, an acute and promptly incapacitating disease, nor like smallpox both acute and visible. In most communicable diseases the doctor is called to the home. The name and address of the patient are readily obtained. Isolation and quarantine follow immediately and continue throughout the duration of the disease. The neighborhood is aware of the illness and demands rigid adherence to the regulations. The time factor is short. There is no public disgrace associated with having the disease.

The patient with early syphilis is rarely sick enough to call the doctor; he goes to the doctor's office. In Massachusetts, nearly 25 per cent go to out-of-town physicians for treatment. If syphilis is suspected, a false name and address may be given. There is no isolation or quarantine. The disease is readily hidden from even the most intimate members of the patient's immediate family and there is usually adequate personal desire to keep it hidden. If the physician has failed to instruct the patient, nobody knows it. Adequate treatment requires months and years and the cost is often excessive. If the patient stops treatment the physician rarely reports the fact, and if he does the chances are equal that the patient may or may not be found. It is almost inconceivable that the time will ever come when a person will openly admit his infection and allow the authorities publicly to supervise his conduct and his treatment until he is no longer dangerous.

Any law or regulation, therefore, which attempts to force the syphilitic into the open will succeed only in driving him to the cover

of the drug store, the charlatan, the unscrupulous physician or to no treatment at all. Treatment cannot be made compulsory for the patient who declines to be discovered, or who, feeling the heel of authority about to descend, decides to lose himself under a false name or a changed address. Compulsion must be reserved for the relatively few who are feeble-minded, vicious, or criminal exactly as in tuberculosis. Even then, whenever possible, the direct action should be aimed at the antisocial behavior rather than at the diseased condition of the patient.

Further, there is no method by which the patient's conduct may be supervised outside the physician's office or the clinic, and while regular treatment shortens the period of open communicability there are innumerable instances of exposure to infection by a patient under treatment. The isolation of every patient with syphilis until he can under no circumstances transmit the disease is economically impossible even conceding that the patient, knowing that he would be isolated, would permit his infection to become known.

The control of syphilis, therefore, must depend upon the extent to which the patient can be trusted. How well he can be trusted depends a great deal upon how carefully he has been instructed. If our clinics almost invariably neglect this most important matter, what must the situation be in the busy, unsympathetic and often therapeutically ignorant doctor's office!

Even in the matter of reporting, compulsion has little success, since it is easy for the uncoöperative physician to deny having made the diagnosis, and difficult to persuade the patient to testify at any hearing as to his condition. A few months ago it was discovered that several physicians had failed to report a single case of gonorrhea although they had received several reports of positive smears from our state laboratory. Letters were written suggesting that the cases be reported. Later investigation disclosed, not improved reporting, but termination of the use of the laboratory.

A storm of protest followed a regulation requiring that certain printed instructions be given by the physician to every patient with syphilis. Some of this was justified, for none of the available literature suits every type of case. When the regulation was removed and the literature simply offered to the physician by way of sample copies mailed to each one of them, the demand for it was both prompt and general. How many states which order physicians to give their patients these printed instructions have any evidence that the regulation is generally obeyed? There can be too much arbitrary telling the physician what he must do and too little of letting him work out the



problem, as an intelligent individual, with the health officer. The thoughtful health officer is more interested in results slowly but surely achieved than in the empty ring of his "billy" on the midnight air.

Authority, then, should be given to health officers to make epidemiological studies and to develop a program for the control of syphilis. Resources should be given health officers to provide services, aid clinics, maintain hospital beds, and make adequate diagnostic and therapeutic care available. The regulations of the boards of health should define the manner in which these services may best be utilized, but should not be so irritating and so arbitrarily enforced that they defeat their purpose. There has been little of compulsion in the control of tuberculosis. Progress in the solution of that problem has been almost directly in proportion to the number and quality of the services which have been made freely available to both the physician and the tuberculous.

Epidemiology is the bookkeeping of public health. Until the reporting of syphilis becomes more nearly complete it will be difficult to measure the whole length and breadth of progress, but generations of public and medical prejudice will not be overcome by the overnight decision of the health officer to have syphilis reported. There is no need to wait for more evidence before proceeding with a program. It is picayunish so to insist upon rule-of-thumb administrative procedures that the main object is defeated.

Among the first things necessary to improve reporting is to modify the cumbersome and complicated reporting systems. One health department has forms as large as business correspondence stationery. It would take 10 or 15 minutes to fill one out completely and intelligently. The 16- or 20-page book of detailed regulations accompanying the forms would puzzle an expert if he had time to read it. Another has no less than 11 forms to be used for reporting this or that. The physician would be remarkable who even knew he had all of them, let alone how and when to use them. The minimum number of forms in current use seems to be 5; 1 each for gonorrhea, syphilis, 1 reporting a delinquent patient, notifying a former physician of the patient's change of medical adviser, and reporting the source of the patient's infection. Is it any wonder that the average physician, surrounded on all sides by birth certificates, death certificates, liquor prescriptions, narcotic blanks, questionnaires, other communicable disease reports, unpaid bills and income tax reports, balks at this further complication which, so far as he can see, serves no other purpose than telling the health officer something about which nothing is ever done?

In Massachusetts, 1 form has been devised to serve every purpose,

and business reply envelopes are provided so that there is no expense to the physician for postage. This simplification of the reporting system was responsible in no small part for an increase from less than 6,000 to more than 11,000 reports in a single year.

There is no essential administrative value in requiring the name of the coöperative patient. Nothing is done about it except possibly to discount duplicate reports. Requiring the name discourages reporting and encourages the use of aliases. Let the report serve simply for the collection of the maximum of essential epidemiological data, which can be obtained with a minimum of irritating inconvenience to the co-operating physician.

Under the subject of medical care there are to be considered:

1. Adequate treatment of the patient in the physician's office and in the clinic
2. Follow-up of the delinquent patient, contacts, and the source of infection

Adequate treatment for the patient involves the undergraduate and postgraduate training of the physician in anti-syphilitic therapy and public health procedure, the provision of Wassermann laboratory service and dark-field examination, a readily available supply at least of arsenicals for every patient, adequate free or part-pay clinic service at convenient hours and with sufficient personnel to give the necessary time to the patient. It is necessary to educate the public to suspect every promiscuous intercourse as being a contact with infection, to realize the importance of adequate treatment begun soon after infection, and the wisdom of premarital examination and routine Wassermann examination in every pregnancy.

Physicians are not entirely to blame for their general unfamiliarity with anti-syphilitic therapy, but the medical profession can correct the situation by insisting upon adequate instruction, in the future, in the medical schools. For those already out of school, other provision must be made, since specialists will never adequately cover the ground. Demonstration clinics, talks to medical societies and hospital staffs, postgraduate clinic courses, brief, up-to-date texts on the management of syphilis, constant reminders, in one way or another, of the communicability of the disease, all help to keep the subject alive. The more rapidly the public is taught what to expect in the way of anti-syphilitic treatment, the more rapidly will physicians have to increase their knowledge and improve their technic.

In Massachusetts, one trained member of the department is making office-to-office visits to every physician in the state, calling attention to services, discussing cases, talking treatment, listening to sug-

gestions as to how services may be improved, accepting complaints, and in every way possible attempting to interest the physician and discover how he can be made a more willing and better equipped partner with the department in its program. In this we are following the example of Dr. Coombs and the Maine Health Department.

Every state should have adequate and accurate Wassermann laboratory service, freely available. Dark-field examination service is more difficult to provide, for no method has been devised which obviates sending the patient to the laboratory; yet this procedure is the only one upon which a diagnosis of primary sero-negative syphilis can be made, and treatment begun in this stage leads in almost every case to cure. No clinic should be without dark-field equipment and a competent observer, and it should serve as the diagnostic center for its area.

There is some debate as to how far the state or the local board of health should go toward supplying all the medication necessary, in early syphilis at least. Some board of health clinics treat patients only during the openly communicable stage. This is, of course, worse than useless, since inadequate treatment leads to relapse and even greater communicability. Some states provide arsenicals only for the treatment of the indigent. This results in red tape and the neglect of those who decline to be officially recorded as paupers. Certainly there can be no good reason why the arsenicals, which are the chief sterilizing agents; should not be made as freely available to any physician for any patient as is antitoxin for diphtheria. Logically, either bismuth or mercury should also be provided, since arsenicals cannot be given continuously, and these other products are essential to adequate treatment if the disease is to be kept non-communicable. However, if arsenicals are available treatment may be begun and there will be some time in which to make whatever economic adjustment may be necessary for its continuation.

There is much to be desired both as to the number of clinics which should be maintained and the quality of their services. Unfortunately it is usually impossible to operate a clinic successfully in a community of less than 30,000 or 40,000 people because of public curiosity. How to provide this service for large areas composed of small cities and towns is still very much a problem. At any rate, there is ample room for improvement in the clinics that are now being operated. There can be little comfort in being forced by economic circumstances to sit with a hundred others for an hour or more, on hard benches, in a barren waiting room, with nothing to read or do, until an impersonal clerk calls out a number, becomes irritated if you have dozed and are slow

to respond, then crowd into line with a dozen others in a small room, let down your trousers or lift up your skirts as the case may be, to receive, almost in full view of the rest, a jab in the buttocks, and be dismissed with the routine admonition, "come back next week." Not a smile, not a kindly word of explanation to set your fears at rest. No one to tell you whether next week's treatment is the last or only one more in a life-long series. A mysterious business, a barren place, an impersonal, repelling atmosphere, and a bawling out if you cannot see the sense of attending any longer. If physicians' offices were managed in this manner, there would be no patients in them. Yet we expect by these methods to control a dangerous communicable disease in a patient on whom our only hold is his confidence in us and his trustworthiness.

Adequate treatment cannot be defined, however, as that which the patient receives after he has come to medical attention, unless he has come in time. No matter how thoroughly competent physicians become, nor how luxurious and complete our clinic service may be made, so long as 2 out of every 3 patients begin treatment only after a year or more has passed since infection, there can be little adequate treatment; and since the disease is most highly communicable during the first year, there can be no progress in its control. Thus there must be public education.

The follow-up of the delinquent patient is a serious problem. It is almost impossible to persuade physicians to report the delinquent. This may be justifiable in small towns where the report of a name to the local board of health may prove extremely embarrassing to the patient. It can also be appreciated that the physician is almost certain to lose permanently any patient whom he causes to be visited by the health officer. It has already been pointed out that half the patients who are reported cannot be found. After listening to the accounts of some health officers of their "capture" of some delinquent patient and their window-peeping methods on the trail of a source of infection, I have lost some of my faith in the advisability of turning this delicate problem over to untrained and insensitive persons. They are apt to threaten where only tact is needed; they may accuse when only sympathetic understanding will clear the path to the doctor's office; they sometimes ask the unsuspecting wife why the husband has neglected to go to the clinic; they have the common belief that syphilis is synonymous with sin and they become police officers rather than health officers.

It is a matter of record that a competent, sympathetic medical social worker in a clinic not only will reduce delinquency to a minimum,

but will secure the examination of many of the family contacts and a large proportion of the identifiable sources of infection. I doubt that, except in rare instances, any health officer could do anything for or with a delinquent that a good medical social worker has had to give up. If it is worth while to provide good medical social service in clinics, why not apply the principle to the whole problem of the delinquent patient?

Suppose the reporting of these patients and sources of infection be entirely discontinued, and the physician be permitted instead to call for the service of a medical social worker. Communicable disease nurses and tuberculosis nurses are now employed by most boards of health—why not a specially trained nurse to visit syphilis patients? But instead of making her visit one of public record, let her make the doctor's office her starting point and let her forget the identity of the patient when she has reported back. The principle is exactly the same, only the route taken is different and the training more specialized. The patient cannot resent the tactful, private approach of a woman representing, not the board of health, but the doctor, who explains why treatment may not safely be neglected. The physician has no cause for complaint at the return of his patients, even though a few, unable to pay his fee, may have been referred, with his permission, to a clinic. The board of health will have established no new type of service since it already visits in case of other communicable diseases, and its object, to keep patients under treatment, will be accomplished far more satisfactorily than would be possible by any other method. True, the patient's name does not become official property, but that may be dispensed with to no administrative disadvantage. This method of follow-up has been tried in some 50 cases in one physician's practice in Massachusetts, to the complete satisfaction of everybody.

We know the cause and mode of spread of syphilis. We have the means for its diagnosis. We have an effective therapeutic agent. We know enough about its epidemiology to warrant unusual effort for its control. We can see that it cannot be controlled by rule-of-thumb procedures. Let us, then, shape our program to our problem and stop begging the problem to be reasonable.

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## Lame English

**F**IND me a man whose syntax is snarled and I'll show you a man whose thinking is also snarled. Lame English runs neck and neck with spavined logic.

MENCKEN

# When the Doctor Prescribes Books<sup>\*</sup>

CATHERINE POYAS WALKER

*Librarian 4th Corps Area, U. S. Army, Atlanta, Ga., Member American Library Association Hospital Libraries Committee*

WHEN the doctor prescribes books, the hospital library, whether owned by the hospital, supplied by the city libraries, or by the federal or state governments, must stand ready to fill the prescription. While to the casual observer the books carried to the patient may appear to be given out in an almost haphazard manner, there is no greater care taken by librarians than toward eliminating the wrong ones from hospital libraries, and insuring the right book for the right patient, in order to bring about the therapeutic value of well chosen reading.

That the selection of books for their curative value is necessary in hospital libraries would seem apparent. It is the purpose of many of the hospital librarians to cumulate and formulate what they have learned from their individual experiences in order to eliminate difficulties for others. As a suggestion, it would seem advisable that they turn their attention toward the formulation of a mental and psychological symptomatology of various diseases, which would be of enormous value in hospital libraries, while in them the physical characteristics of illnesses are of lesser importance, besides being readily available from the hospital records on each patient.

Doctors in charge frequently help librarians by describing individual mental symptoms of particular patients, which are of the utmost value in prescribing suitable books, and these specific instances would seem to prove the need for the general psychological symptomatology. This would be to the hospital library what the general symptomatology is to the physician. Individual application in every case would remain necessary, for the librarian as well as the doctor.

The large public library, with its great demands from readers of every character, provided it has a fairly adequate book fund, presents few problems in book selection, since it buys practically every book published, leaving the selection to the discrimination and interests of the reader, with the advice of the staff when needed.

The hospital library, as a rule, has a very limited book fund, which

<sup>\*</sup> A Psychological Symptomatology Advocated to aid in Bibliotherapy.

may, at first glance, appear reasonably adequate, as a hospital contains but a small number of readers in comparison with that of a great public library; yet, every type of reader belonging to a large public library is likely to become one of the readers in the hospital library. Consequently, upon a small book fund, the hospital library must attempt to furnish interest for everyone, from the patient whose daily labors provide no time for reading except when confined to bed, to the omnivorous reader who keeps up with the latest book criticisms and demands the latest selections of the various book clubs, or who even considers those out-dated. The enforced idleness of hospitalization frequently makes readers out of patients who, outside the hospital, would prefer other occupations and diversions.

Interest is the first requisite in all curative reading. No patient will open his eyes and quickly swallow a sugar-coated book because advised of its remedial value. Indeed, unless a book creates interest, it is greatly to be questioned whether it will have therapeutic qualities—unless, perchance, irritation were what the doctor prescribed. While the seldom-reading patient is probably easily satisfied with material at hand, the voracious and sophisticated reader, accustomed to large collections of books, and frequently resenting suggestions, often presents a more serious problem in hospital libraries, usually necessarily small.

There are several general aspects to be considered in book selection for the hospital library. A book which may be helpful, or at least harmless, in one ward, may be very harmful in another. Then there is a general psychological symptomatology to be taken into consideration before prescribing a book. There are obvious, generally well known, blanket rules for book selection in various hospitals; for instance, in the penitentiary hospitals, mystery, crime, and detective stories are usually banned; in mental hospitals, the mere mention of the word "crazy," however apparently harmless its context, may have an unfortunate effect; tuberculous patients should have cheerful books; and so forth. Concerning the books themselves, in general, those dwelling upon, and describing disease, ill or deformed characters, must be avoided; to some patients the subject of finances is one of great matter, and even humorous accounts of attempts to secure money may not seem amusing to them. One man's humor is another man's grief, might well be the epigram for the hospital librarian regarding so-called humorous books, and the same caution applies to the "cheerful" books—there is usually nothing more annoying to patients than an enforcedly and persistently cheerful book or person. The old-fashioned novel demanded by some readers will not be tolerated by

others. On the other hand, the hospital might find its curative purpose rather defeated if the librarian gave its patients certain modern novels, the trend of which would seem to be the utter futility of living. The therapeutic value of the writings of many of the young sophisticates who believe that by intuition they have grasped new wisdom unsuspected by the ages, is also questionable. A book with a persistent dwelling on sex is not usually conducive to good health. Introspective books, those dealing with family squabbles, marital difficulties, suicides, gruesome and horrible details, problems of various sorts, and religion are dangerous topics to present to some readers, who may be shut up in one small room for an indefinite period. For instance, one very ill patient to whom a kind hearted friend gave a copy of "Dracula," suffered from increased temperature and sleeplessness after reading it.

The casual reading of a book is not sufficient to determine its fitness for a hospital. For instance, a covered-wagon novel of the western march of a family and caravan appeared to be excellent hospital material, being well told, with graphic descriptions of outdoor life on the trail, hardships courageously met, of sufficiently probable, yet not too gruesome relations with the Indians; but suddenly toward the end the author described the birth of a baby. While, for hospital readers, there is nothing harmful in that of itself, and there was no undue dwelling upon clinical details, yet the fact that anxiety over a missing husband, and lack of care to the mother, made her become "addled," would make this book dubious reading for a maternity ward, or a psychoneurotic patient, and would quite overcome the pleasant outdoor interest of the early chapters. Even the facts that the husband eventually returned, and the wife's mind became restored might not counteract the disagreeable episodes; yet for a reader not in a hospital, this is an interesting story.

Another recent novel dwells upon the problems of the parents of a dwarf, again, scarcely suitable for most hospital patients. It is to be doubted if Willa Cather's *Shadows on the Rock*, though it will be requested by many patients, will be a good prescription, on account of the deformities described, one resulting from the suppuration of a wound due to neglect; the Indian and prison tortures, and similar horrors of prisons and man's inhumanity to man, the very excellence of the writing but serves to make more graphic.

Censorship is abhorrent in thought to most librarians; yet it would seem—with the object of restoring patients as rapidly as possible, through the entertainment, recreation and fellowship of books—even the general hospital library books must be selected with the greatest



care, and that in addition, the hospital librarian must give individual diagnosis to the reading prescription, and thought, not only to the general symptomatology and to the causes responsible for it, but also to the particular needs and fancies of each patient, preventing, as does the pharmacist, the indiscriminate use of what might be poison in some instances, yet have therapeutic value in others. The ideal situation is not to restrict the books placed in the hospital library, but to limit their use to patients.

It cannot be overemphasized that the proposed psychological symptomatology would no more relieve the librarian's responsibility from individual reading diagnosis for each patient, than does a general symptomatology relieve a physician from the consideration of each patient. Yet as a physician can use the general as a basis from which to particularize, so it is believed might the hospital librarian find the advocated psychological symptomatology a great help, when, with the aid of hospital librarians, psychiatrists, psychologists, mental hygienists, and others interested, such a book can be compiled.

In the case of the general hospitals the book might be prepared to answer such questions as: Does angina pectoris, for instance, require a different mental diet of books from some other "heart diseases"? Are the patients suffering from it not to be given exciting detective novels, with gory detailed accounts of murders, or, if the patient demands them, should the librarian furnish such reading rather than try to dissuade him or offer substitutes?

If a patient with Bright's disease is irritable, does it go with the disease, or is it peculiar to the particular patient? If it goes with the disease, is the irritation continuous or spasmodic? Is there hope of cheerful books proving a corrective for a depressed outlook?

If a certain amount of irritation naturally accompanies a physical disease of a certain name, the librarian might have a more scientific basis of knowing when to be slightly insistent in offering books to a new patient who gruffly refuses to take anything offered, and appears to have a general grouch against everything. Some patients really want to be urged a little. Some are not sure they will not have to pay for the books. Naturally, the last object the librarian has is to annoy the patients in any way whatsoever, but the selections might be slightly more scientific than those now made on just intuition, tact, or general guess work.

Abnormal psychology is not needed for general patients who are not really abnormal, but frequently conditioned mentally by physical states requiring a long shut-in period. Some short-cut is needed for hospital librarians to find out the mental states that accompany the

various diseases, without studying the physical conditions involved, and without appealing to overworked doctors to help them out.

In the case of the mental hospitals, the selection of a book, representing a series of mental stimulus involving various reactions, means an almost overwhelming amount of individual knowledge concerning the problems of a particular patient and the causes of his condition—if they can be learned—to be sure that the effect will be beneficial. Consultation with the doctors in charge is frequently, and almost invariably necessary. The mental hospitals require librarians as specially trained as psychiatrists rather than “family physicians.” Yet what is to provide that special training for librarians who cannot in most instances become also psychiatrists?

In any hospital, mental or general, the human element, the individual, would always have to be considered—whether his hatreds were ghosts or finances, family problems, too much mother-in-law, or what-not; whether he prefers golf or baseball, art or engineering, or whether all professional reminders are taboo during illness; or in the case of a woman, whether she prefers a sweet love story, or a problem novel, or it takes something very “sophisticated” to arouse her interest, or if any mention of sentiment is to be avoided altogether.

As a basis upon which to train all hospital librarians, as a textbook for their training, and as their reference foundation from which to start their diagnoses to aid their patients, in a general hospital and even in a mental hospital, it is believed that the proposed psychological symptomatology might provide that foundation and generalization from which any hospital librarian might work toward individual understanding of the book needs of each of her patients.

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## The Greatest of These is Health

WHATEVER else might change, it remained true that among the assets on which we had to rely in the new advance there was none so rich as the health of the nation. Economy was one thing, parsimony another. Economy enriched; parsimony might impoverish. Economy demanded the development of national assets so that each might give the greatest return to the nation. The return on no asset of the nation could be more increased by development than the return on the asset of health. The common health was the very foundation on which all fresh effort must be built, the base from which all advance must proceed. “Health, liberty, and wealth, and the greatest of these is health; for if a nation has that, the others will be added to it.”—Sir Hilton Young, Minister of Health, *Med. Off.*, Nov. 28, 1931, p. 234.

# EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

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## SIR DAVID BRUCE

NEWS of the death of Sir David Bruce comes to us from abroad. Born in Australia, he was educated at Edinburgh University, and became a member of the Army Medical Service in 1883. From 1889 to 1894, he was Assistant Professor of Pathology at the Army Medical School, and later, for 4 years he edited the *Journal of the Royal Army Medical Corps*.

Sir David Bruce was one of the early workers in tropical medicine, and is justly regarded as one of the founders of that branch of our science. His first work which brought him into notice was the discovery of the cause of Malta fever, which produced much invalidism in the naval forces of England in the Mediterranean and great loss of money. He showed that it was carried by the goat through the milk, and discovered the germ known as the *Micrococcus melitensis*. He made investigations of nagana and tsetse fly disease, showing that they were one and the same, due to a trypanosome which was carried by the tsetse fly. This is believed to be the first instance in which an insect was shown to be the carrier of a disease producing protozoan parasite.

The Royal Society in 1903 sent him to Uganda to study trypanosomiasis in that stricken country. Castellani had shown that the trypanosome was found in the spinal fluid in cases of sleeping sickness. Bruce went further and proved that the organism was the cause of the disease, and later that the *Glossina palpalis* was the carrier of this

particular trypanosome, the distribution of the disease corresponding with that of the fly.

During the World War he was chairman of the committee on tetanus, and later chairman of that for the study of trench fever. Many honors were conferred on him by universities and societies, and it will be remembered that the trypanosome of nagana bears his name.

His passing at the age of 74 takes away one of the founders of the science of tropical medicine.

### DR. PETER H. BRYCE

THE death of Dr. Peter H. Bryce, of Ottawa, Canada, will sadden every member of the Association, removing from us, as it does, one of our oldest members—he joined the Association in 1883. He became President in 1900, after having served on various committees and held other positions of usefulness and honor in our Association. In recognition of his services to the Association, he was elected an Honorary Fellow in 1922.

Dr. Bryce was honored and beloved by all who knew him, genial in character, honest, and outspoken. A long career of usefulness in his native country in various positions led to a pension soon after the World War.

The newspapers tell us that he died on board ship while seeking a rest in a warmer climate. A fuller history of his activities will be given in our next issue. "Requiescat in pace" will be the earnest prayer of all those who were fortunate enough to know him.

### VOLUNTARY EUTHANASIA

THE question of euthanasia has been discussed for many years. There are many things in it which appeal to everyone, but so many objections to it, legal and otherwise, that it has not been generally accepted.

The newly elected President of the Society of Medical Officers of Health of England gave as his Presidential Address' a most interesting and scholarly discussion in which he advocated the legalization of voluntary euthanasia, and outlined the essential provisions for such an act. His proposition is that individuals of proper age and mentality who are suffering from incurable and fatal diseases which entail a slow and painful death should be allowed to substitute a quick and painless one, after complying with certain conditions. He regards this not only as an act of mercy, but "as a matter of elementary human right."

His discussion of this question shows much research and clear reasoning, taking up, in turn, the fear of death, the legality of suicide, the Christian attitude toward it, ethical and practical objections. Many readers will doubtless be surprised to learn of the attitude of prominent churchmen in the past, and one, Canon Green, makes a statement which is hard to answer: "One might, of course, argue that as God alone confers life, God alone may decree its end. That argument, however, is impossible while we permit war and capital punishment. . . . I have found it impossible to discover any really conclusive argument against suicide under due restrictions."

Recently, Dean Inge, who is well known for his writings on religious and ethical subjects, has shown a distinctly sympathetic attitude toward euthanasia, pointing out the anomaly of putting a horse or dog out of its misery, but undergoing the danger of hanging for helping a patient suffering with cancer with an overdose of morphine. He closes, however, with the statement that if he should ever suffer from such a disease he hopes that he would have patience to await the end.

It is generally held that suicide is an act of moral cowardice, and in many cases this is doubtless true; a father, for example, leaving a dependent wife and children without means of support. It has been condemned in many countries—in fact it is a criminal act in some, and an unsuccessful attempt often leads one into the courts for punishment, which has included the confiscation of property. Further, suicides have been denied Christian burial as well as interment in consecrated ground. For centuries suicides were buried at crossroads with a stake driven through the body, and this was discontinued in England only 50 years ago.

The religious side is based largely on the command "Thou shalt not kill," which has been revised to read "Thou shalt do no murder." The Fathers of the Church interpreted the original version to include one's self in the order against killing, and the early Christians took the view "it was desertion of a sacred trust without permission of God."

Euthanasia has very properly been objected to on legal grounds as opening the door for murder. Voluntary euthanasia as outlined by Dr. Millard would apparently be free from this objection. Cases arise frequently in which the hearts of the family of a sufferer are torn by conflicting emotions. In this country a short time ago we had the case of a father who, feeling that his end was near, put to death his incompetent daughter to whom he had devoted his life, his object being to make sure that she would not suffer from neglect at the hands of those to whom she was not dear. The current papers are carrying

the story of a woman in Copenhagen who deliberately overdosed her mother, Baroness Von Dueben. The judge in this case is said to have viewed the case leniently, being convinced that there was no malice and that the action of the daughter was founded in love and the desire to end hopeless suffering.

On the other hand, in certain countries and under certain conditions, suicide is considered an act worthy of commendation. It has always been regarded as praiseworthy for soldiers and sailors to die rather than surrender, and even to put themselves to death to avoid capture. In China it is honorable for women to kill themselves at the death of their husbands, and in Japan suicide may be legally done to avoid disgrace, to restore honor, as a matter of protest, and from loyalty to a superior. Many will remember the death by hara-kiri of one of Japan's foremost statesmen only a few years ago.

Doubtless the Presidential Address of Dr. Millard will cause much discussion and bring protests. The great majority of the people of the western nations, at least, are not ready for such an innovation, but no one can read it without learning much, and for many we believe that it will help to do away with the practically universal fear of death, which the late Professor Metchnikoff held was given to us for the preservation of the species.

"The great task of Medicine is to prevent disease; and failing that, to cure disease. If it fails in both, science, at least, enables us to shorten the sufferings caused by disease."

#### REFERENCE

1. The Legalization of Voluntary Euthanasia, *Pub. Health*, Nov., 1931, p. 39.

# ASSOCIATION NEWS

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A. P. H. A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

### *Health Officers Section*

Manuel R. Benitez, M.D., Dept. of Health, San Juan, P. R., Assistant Director, Bureau of Communicable Diseases

Ramon B. Berdecia, M.D., Box 1266, San Juan, P. R., General Medical Inspector

F. R. Dew, M.D., St. Clairsville, O., Health Commissioner

Cesar Dominguez, M.D., P. O. Box 92, Humacao, P. R., Medical Officer

T. Paul Haney, Jr., M.D., McComb, Miss., Director, Pike County Health Dept.

Dr. M. R. Kinde, Hastings, Mich., County Health Officer

A. D. Park, M.D., Hartford, Ky., Director, Ohio County Health Unit

John H. Williams, M.D., Suites 2 & 3, Neely Block, Muncie, Ind., City Health Officer

### *Laboratory Section*

Carl A. Nowak, Nowak Chemical Labs., 1327 Chemical Bldg., St. Louis, Mo., Laboratory worker

### *Vital Statistics Section*

Elliott H. Pennell, U. S. Public Health Service, Washington, D. C., Assistant Statistician

Manuel A. Perez, Bur. of Vital Statistics, Dept. of Health, San Juan, P. R., Chief

### *Public Health Engineering Section*

Herman G. Baity, Sc.D., Dean, School of Engineering, Univ. of North Carolina, Chapel Hill, N. C., Professor of Sanitary and Municipal Engr.

Pedro M. Otero, Dept. of Health, San Juan, P. R., Engineer, Bur. of Malaria Control

Ralph M. Palmer, 10 E. 40th St., New York, N. Y., Chemical Engineer

Walter Spencer, S. Jersey Assn. of Water Supts., 7220 Walnut Ave., Merchantville, N. J., Asst. Supt., Merchantville-Pennsauken Water Comm.

### *Child Hygiene Section*

Marta Robert de Romeu, M.D., Parque St. 91½, Santurce, P. R., Director, Bur. of Child Hygiene

### *Public Health Education Section*

Mildred I. Dillistin, City Hall, Middletown, N. Y., Asst. to Health Officer

Marie F. Kirwan, 245 E. 21st St., New York, N. Y., Extension Secty., New York State Comm. on Tuberculosis and Public Health.

### *Public Health Nursing Section*

Helen S. Orth, R.N., Mt. Vernon, Ky., County Health Nurse

Bosse B. Randle, R.N., Bd. of Ed., 143 Bostwick, N. E., Grand Rapids, Mich., Supv. of Nurses

### *Epidemiology Section*

Abel de Juan, Dept. of Health, San Juan, P. R., Dir. Bur. of Comm. Disease

### *Unaffiliated*

Antonio Arbona, M.D., P. O. Box 221, San Juan, P. R., Medical Officer, Bur. of Malaria Control

Jose R. Pastor, M.D., Dept. of Health, San Juan, P. R., Director, Bur. of Tuberculosis

### DECEASED MEMBERS

J. S. Fulton, M.D., Baltimore, Md., Elected Member 1915, Fellow 1923

P. Martin Keller, M.D., Glendale, Calif., Elected Member 1929, Fellow 1931

Professor Herbert H. Waite, Lincoln, Nebr., Elected Member 1913, Fellow 1923

Andrew A. Cairns, M.D., Philadelphia, Pa., Elected Member 1914

Homer V. Knouse, Omaha, Nebr., Elected Member 1925

## TRAINING AND PERSONNEL

WITH the full support of the present administration of the Association, your Committee on Training and Personnel is undertaking an active program for the improvement of tenure and the further professionalizing of public health work. Through the use of this space, which has been made available to the committee by the Editor of the JOURNAL, we hope to keep you informed concerning the plans and activities of the committee and to give you news of interesting developments in the field. Constructive suggestions from fellows and members of the Association, sent to the committee at the New York office, will always be welcome.

The following statement is taken from a program of work recently approved by the committee, and presents the point of view with which the task is being approached. Specific plans and activities will be presented in subsequent issues.

### PRINCIPLES AND PROCEDURE

A. The activities of the Association must be based upon the fact that public health is a distinct profession.

The mere enumeration of specific public health activities such as epidemiology, vital statistics, public health laboratory procedures, water purification, and food sanitation, makes it obvious that both the administrator and the technical specialists in the health department use a body of knowledge not completely presented in the training for any of the professions most akin to public health. Further recognition is given to this fact, so far as medicine is concerned, in the creation of schools of public health quite separate from the medical schools in several universities. The fact that sanitary and public health engineering are distinct from

civil engineering is recognized by engineering schools which have established specific courses in this field. Similarly special programs of training have been set up for other specialists in public health. Until we can procure a recognition of the importance of special training (or experience) we cannot hope to secure permanency of tenure for the present workers or the appointment of trained workers when vacancies occur.

B. The first interest of the Association is the tenure of office for people in the service at present.

To be sure, we have in our various groups of public health workers at present people with widely diverse training and with varying degrees of efficiency. We must think of all situations and practicable training, not merely of the most important positions and of ideal training.

The people who are in service represent the profession as it exists today. Successful service is an evidence of at least some degree of proficiency. In every field, especially the field of public health administration, there will be difference of opinion as to what ideal training should be, but to start any program which would throw discredit upon present members of the profession who are giving satisfactory service would arouse discord within our own Association, confuse the general public, and retard the whole program.

It is only fair that the people who have gone into this field in the best way available to them and in the absence of specific guidance and who have become proficient through self-education and experience should have their tenure of office supported by the profession. We must not undervalue experience. Not all facts are learned in the classroom,



by any means. We must not, at this time, make a fetish of degrees, to such an extent that we draw sharp lines between present public health workers in service upon the basis of presence or absence of specific public health degrees.

If we are to succeed in improving public health personnel we must stand solidly behind the principle of continued tenure of office for every member of our Association now in professional work. We must begin where we are, start with minimum standards, and work through evolution rather than by revolution.

C. We must stand solidly for the principle that new appointments in public health positions should be made from the group of individuals who are trained in public health either by study or experience, or both.

We will try to keep the present personnel in office and eliminate displacements for political rather than professional reasons. We will try to induce public opinion and appointing authorities to insist upon replacements with properly trained people when vacancies occur in the natural course of events. In order to do this we will have to define some standards of training and experience and accumulate the list of individuals who meet these standards.

D. We should recognize experience as well as training in setting up these first standards.

As indicated above, we must not set up standards which disregard experience and give credit only to training secured through study for a particular public health degree.

## LETTER FROM GREAT BRITAIN

### VACCINATION—COMPULSORY OR VOLUNTARY?

OFF and on for a number of years, particularly since the effects of the "conscientious objection" clauses have made themselves felt, there has been talk among medical officers of health about the advisability of repealing the legislation relating to compulsory vaccination and placing the system upon a voluntary basis.

The transference of the administration of the laws dealing with the subject to the local health authorities following the abolition of the boards of guardians by the Local Government Act, and the issue of the now well known "Review of Certain Present Aspects of Smallpox Prevention in relation particularly to the Vaccination Acts, 1867-1907" by the Ministry of Health, rather brought things to a head. So much so, indeed, that the hunt appears to be fully up, with everybody

clamoring at once for an immediate abandonment of the compulsory system and the substitution of voluntarism.

In a report supporting this demand, prepared by the Medical Officer of Health of Brighton—where Sir Arthur Newsholme officiated for a number of years—and adopted and circulated by the local council, it is pointed out that under compulsion only about 50 per cent of the babies born are vaccinated and that, in any case, judging from the practical disappearance of a death rate from smallpox, it is a disease hardly worth worrying about.

As a further advantage it is claimed that, shorn of compulsion, vaccination would cost the country much less; a saving of about \$500,000 per annum, in fact, is promised. Probably it is this possibility that will influence local health bodies to join in a request to the Minister of Health to present a bill in Parliament for the repeal of the Vac-

cination Acts. The Society of Medical Officers of Health, who, with the Association of County Medical Officers of Health, propose to discuss the question fully, doubtless will consider this point also, in addition to many others of practical and administrative importance, before they make any recommendation to the Minister. That the Minister will decide off-hand to go for abolition, even with the Brighton and other reports in favor before him, is improbable.

The British system of government does not welcome wide and quick changes, and unless he has behind him a Royal Commission or at least a Departmental Committee, it is unlikely that the Minister will be prepared to suggest in the first instance anything more drastic than an amendment of certain provisions of the Acts or the issue of an order that will allow of simplification of the administrative procedure.

#### THE ORGANIZATION OF HEALTH EDUCATION

At the fourth annual conference of the Central Council for Health Education, held at the School of Hygiene and Tropical Medicine in London toward the end of November, health officers and representatives of health authorities, insurance committees and companies, and others interested in health education had the opportunity of conferring one with the other on the subject generally and hearing experts dealing with particular aspects and matters. Prominent among the speakers was Mr. Greenwood, Minister of Health in the previous administration, who, in pressing the claims of health education, claimed that it was "one of the most important factors in improving the level of public health in the country," and that the return obtained was out of all proportion to the expenditure upon it. The object of this latter pronouncement was to allow of an appeal to health authorities and others with funds

at their disposal, in their zeal for economy, to refrain from cutting down contributions to the Central Council.

As a fact, there are few organizations, so far as health propaganda and publicity are concerned, more deserving of support than the Central Council for Health Education. Formed by and at the instance of the Society of Medical Officers of Health, its own main object is economy: saving of trouble and expense to health officers and health authorities, insurance committees and approved societies (under the National Insurance Acts), insurance companies, etc., all of whom require guidance in connection with the choice of health educational organizations, material and what not.

Great Britain may not be unique in this respect, but one of the troubles, so far as health teaching is concerned, is the remarkable profusion of societies and associations, voluntary mainly, all longing to assist the official bodies in their propaganda with lecturers, leaflets, posters, cinema films, and so on. So many were these organizations and so much did they overlap, that the authorities were hard put to it to know the one from the other and the good from the bad.

The Central Council for Health Education, with the authority of the Society of Medical Officers of Health behind it, set about bringing order out of chaos; affording facilities for affiliation of the societies suitable for recognition: serving as a sign-post directing authorities, etc., to bodies appropriate for their particular purposes; advising with regard to literature and affixing their seal to suitable leaflets, pamphlets, films, etc.; keeping lists of lecturers; arranging for the loan of teaching material—films, etc.; communicating health articles to the press; and so forth.

Incidentally, one of the most useful and successful ventures of the Council is the publication of a propaganda

journal. Published under the title of *Better Health*, this journal enjoys a circulation of over 300,000 copies a month, and fulfils a most useful purpose. Another most useful function performed by the Council is in relation to the assistance given to insurance companies, committees and societies in the preparation of leaflets, and steadily greater and greater importance is coming to be attached to the seal of the Council upon health publications of various sorts. Of all the several contributions to the health service of the people by the Society of Medical Officers of Health there is none of greater value and moment than the Central Council for Health Education, and it is to be hoped that, in spite of the economy wave, funds sufficient to keep it afloat will be forthcoming.

#### THE PRINCE AND HOSPITAL OUT-PATIENTS

The Prince of Wales, whose interest in the work of hospitals in general, and those in London perhaps especially, is well known, has been greatly impressed by complaints made with regard to the overcrowding of out-patient (extern) departments and the length of time those seeking advice frequently are required to wait. With a view to seeing what can be done and whether in order to remedy these and other defects the departments in question should, apart from emergencies, be used only for the purposes of consultation with patients sent for second opinions or specialist treatments, his Royal Highness has

formed a special committee with directions to inquire.

Lieut.-Colonel Fremantle, who has been invited to serve upon this body, may be regarded as representing the public health service thereon since, though it is now some years since he resigned his appointment as County Medical Officer of Health of Hertfordshire to enter Parliament, he has continued to maintain close touch with the Society and his fellows, acting as Member of Council and attending meetings with as great regularity as his parliamentary duties will allow.

#### HONORARY FELLOWS—SOCIETY OF MEDICAL OFFICERS OF HEALTH

The nomination of Surgeon-General Hugh S. Cumming of the U. S. Public Health Service, and of Dr. F. F. Russell, Medical Director, Rockefeller Foundation, to the Honorary Fellowship of the Society of Medical Officers of Health of Great Britain has appealed to the many friends and admirers of these distinguished authorities on public health and preventive medicine on this side as eminently appropriate and has afforded very real gratification. Among others nominated by the Council of the Society on this occasion were Sir George Newman, Chief Medical Officer, Ministry of Health, England and Wales; Dr. Carl Humel, President, State Department of Health, Germany; and Professor Thorvald J. M. Madsen, Director, State Serum Institute, Copenhagen, Denmark.

CHARLES PORTER, M.D.

London

# PUBLIC HEALTH ADMINISTRATION

## BUSINESS AND OTHER STATISTICS IN HEALTH DEPARTMENT WORK BY MACHINE TABULATION

J. L. POMEROY, M. D., F. A. P. H. A.

*Los Angeles County Health Officer, Los Angeles, Calif.*

IT has become of tremendous importance in modern public health work to analyze much more intensely than was formerly necessary not only the results from a professional standpoint, but to combine cost statistics with the usual record of achievement. The pressing need of economical operation, the serious problem of meeting the criticisms of various investigating bodies, particularly those representing taxpayers, and the value of detailed data in the preparation of budgets, all justify the expenditure of considerable sums of money in securing adequate cost statistics. It appears that but little attention has been paid to this problem in public health work, and the system in vogue in the Los Angeles County Health Department may be of value to other similar departments throughout the United States.

The Los Angeles County Health Department resembles in many features that of a state department or a large incorporated city. The department performs work not only for rural areas but also for 35 incorporated cities. The total population served at the present time is approximately 800,000, about equally divided between incorporated cities and unincorporated area. The work of the incorporated cities is performed through business agreements between the governing bodies of the cities and the county, and it became necessary to have very accurate statistics both as to units of work and cost,

because of this contractual relationship. Needless to say, the application of these figures has been of enormous importance to the management in increasing efficiency and in revealing weaknesses. It is strongly recommended to health departments that the *Appraisal Form* of the American Public Health Association be used with a system of collecting costs and unit statistics of work.

### HOLLERITH TABULATING MACHINES

In searching throughout the business world for proper machinery, it was found that the electrical tabulating machine method through the assistance of Hollerith cards fitted our needs best. Public health work covers a field of different kinds of operations through which, however, there must be close correlation and coöperation. In its actual operation, there is an infinite variety of details to be considered. It is extremely difficult by hand tabulation to devise master sheets that are capable of being easily handled due to the enormous number of different facts on each sheet. The Hollerith card, however, is capable of handling just such a situation. It is possible on an 80-column card to have as many as 800 different classifications. Furthermore, since the major operations are automatic, the chances of error are reduced to the minimum. It is also possible to go back and take off quickly data which at any time may become very important with no added expense or technical diffi-

culty. With original records this operation would not only be expensive but require a long delay. It often happens in our work that we desire additional data from the past for purposes of comparison and the Hollerith card fulfils this situation. In other words, while the entire factual data from a record may be transferred to the Hollerith card, it is possible to use only a portion for current use and still all the material is in shape that it is readily available when needed.

#### THE CODE

In connection with the use of the Hollerith cards, it became necessary to devise a code of symbols and numbers used to represent functions, places, and things throughout the department. Coupled with this, there have been created a number of definitions which are of great value in the education of each employee in his daily work and his knowledge of the operation of the entire department. The system can be adapted to any health department because the functions can be re-arranged although the code numbers may remain the same. There would be some advantage for comparative purposes between departments if as far as possible the same code numbers became universal.

Our code is based on what is known as the Decimal System. In the County Health Department of Los Angeles County, there are 9 major bureaus which naturally then form a basis for the code. Thus the Bureau of Administration runs from 10 to 19; the Medical Service Bureau from 20 to 29; the Bureau of Maternal and Child Hygiene from 30 to 39; Bureau of Inspections 40-49; Bureau of Nursing 50-59; Bureau of Communicable Disease 60-69; Bureau of Laboratories 70-79; Local District Organization 80-89; Bureau of Medical Social Service 90-99.

In the actual use of the code the

whole numbers refer only to the work of the bureau chiefs, such as 10-20-30, etc. The next numbers, 11-21-31-41, etc., with their decimals refer to the functions and employees immediately working under the bureau chief and functioning throughout all districts. The local work performed throughout the districts and towns uses up the remainder of the digits from 2 to 9 with the usual decimal subdivisions. The arrangement of the code is such that unlimited expansion is possible, and whole numbers are left vacant here and there to pick up new functions as they develop.

#### OTHER CODES

In addition, each city and each employee has a code number. It is thus possible to pick out with the codes all the work performed in any city or town and also to segregate the cost for the entire department by personnel, nurses, inspectors, etc.

#### SYMBOLS

In connection with the code numbers, it was found expedient to use 2 full columns on the card, which permits the creation of 100 letter symbols to indicate the main kinds of work performed. This is precisely the same system as is used in the dial telephone where combinations of letters are used because of the difficulty of remembering numbers running over 4 or 5 digits. The letter code is translated in punching by the punch operator to numbers just as the operation of the telephone dial secures the same results through electrical magnetic operation in the telephone building. The letter system is really of considerable help not only as a memory system, but in segregating.

#### MANUAL

A carefully prepared manual of instructions giving the definitions of all terms used and their abbreviations,

with the different functions of the department, together with the entire code and samples of daily time sheets properly filled out, is furnished each employee.

#### DAILY TIME RECORDS

The character of the time sheets used differs according to the type of work performed, namely whether the worker uses an automobile or performs office work or other work confined to a building. Owing to the fact that the county government pays mileage, it is necessary to keep an absolutely accurate account of the day's trip, giving starting time, stopping time, and the address of each place visited, while the code takes care of the work performed and parallel, horizontal columns provide for the units of work.

#### CLINIC RECORDS

One of the most notable accomplishments has been the adaptation of this method to securing proper clinic records. It is a notorious fact that clinic statistics throughout the United States are relatively very inaccurate. An original and unique system has been built up in the department on clinic statistics and is being rapidly extended throughout the department. A code has been devised for tabulation in the clinics which obviates the necessity of bringing the original records into the office. This card serves as an index to each individual case of tuberculosis throughout the entire county, as well as a statistical card. The system of clinic records worked out in our department was described in "Measuring Out-Patient Service in Los Angeles County"—in *The Modern Hospital*, April, 1931, relative to the accumulation of proper totals on new patients, old patients, etc., concerning which there has been so much confusion throughout the United States in clinic statistics.

The number of cards punched and

sorted monthly is now 75,000. The number of employees in the department averages 455, including full-time and part-time persons. The total budget of the department last year was \$1,218,066.00. For an expenditure of 1.7 per cent of our total budget, we are in a position to secure accurate, detailed cost statistics of major operations of the department. Studies have already been made of costs of clinic visits by bureau and division, and costs of field work, which have resulted in many changes in management. For example, in relation to milk inspection, our studies have enabled us to cut down the cost of this work  $33\frac{1}{3}$  per cent. During the past year, with the aid of the Hollerith cost system the total amount expended by the department was decreased 5 per cent over the year previous, although the amount of floor space increased 31 per cent, the medical work in our clinics increased 33 per cent, and the communicable disease cases handled increased 45 per cent. Actually 5.1 cents less per capita was expended on salaries and maintenance for the year 1930 than in 1929, in spite of an enormous increase in work, due to the improved methods of management resulting from a better knowledge of details in the situation.

#### COMMITTEE ON STANDARDIZATION

In connection with the studies mentioned must be made of the work of the Committee on Standardization. This committee, created about 18 months ago, consists of a representative of the Bureau of Administration and of each of the major bureaus in the department, and considers all requests for new procedure throughout the entire department. Forms have been standardized, as well as the purchase of drugs and other supplies, and every effort made to apply modern business principles in bringing about economical operation. In a widely decentralized department

under the usual bureau system, such a committee correlates and investigates, and represents a fact finding buffer between the chief executive and the employee. It also permits the employee to participate in the management, arouses interest and secures better co-operation.

**Typhoid Fever in Salisbury**—In July, 1930, in Salisbury, Md., there occurred 80 cases of typhoid fever with 7 deaths. Fifty-seven of these cases were under 25 years of age. More females were attacked than males. The outbreak was traced to a typhoid carrier located on a farm producing milk for Dairy B. This dairy produced 3 types of raw milk, the first being put up in quarts, the second in pints and the third being a special baby milk with a colored cap. There were 532 households served by this dairy and in 265 instances milk bottled in quarts was used. In 50 of these 265 homes typhoid developed. In 203 homes, which took milk only in pints, no cases occurred and in 64 homes, taking only the baby milk, there were no cases. The carrier had had contact only with the milk sold in quarts. It was found that milk shakes purchased in drug stores were responsible for 6 cases. When the outbreak occurred a public clinic was established for immunization, at which 7,080 persons were treated and about 5,400 were immunized by private physicians. The population of Salisbury in 1930 was 11,081, while there were 31,304 inhabitants in the county.—S. H. Hurdle, Milk-Borne Epidemic of Typhoid Fever in Salisbury, Md., *J. Prev. Med.*, 5, 465 (Nov.), 1931.

**Goiter Prevention**—A comparison is made in the incidence of goiter in Cleveland and Detroit for the years 1914 and 1931. In the latter city following a survey made in the schools in 1924 a program for goiter prevention

was inaugurated by the Michigan State Health Department providing for the addition of iodine to table salt. In Cleveland opposition to such prophylaxis developed from physicians who emphasized the danger of hyperthyroidism. In Detroit in 1924, 36 per cent of the children examined were found to have goiters while in 1931 this had been reduced to 12 per cent and only 0.3 per cent had iodine deficiency goiters. In Cleveland in 1924, 34 per cent of the children examined had goiters, while in 1931 30 per cent were found to have goiters and 18 per cent suffered from iodine deficiency goiter. The reports of the Detroit Department of Health indicate that the incidence of goiter has decreased from 36 per cent in 1924 to 2.1 in 115,000 pupils examined in 1931. Also the number of toxic goiters has decreased in Detroit hospitals. The author concludes that Michigan has eliminated from her schools thousands of cases of feeble-mindedness which have in the past and would in the future result from endemic goiter.—O. P. Kimball, The Prevention of Goiter in Detroit and Cleveland, *J. A. M. A.*, 97: 1877 (Dec. 19), 1931.

**Illinois**—One of the new activities of the Illinois Department of Health, Division of Public Health Instruction, in 1930, was the construction of a series of scientific exhibits. This was a co-operative undertaking with the University of Illinois Medical College, which constructed the units, while the state division aided in planning and paid for the material and technical work.

Four units were constructed, one each dealing with pneumonia, typhoid, diphtheria, and tuberculosis. Each was built with the idea of presenting as fully as practicable the history, characteristics, importance, and means of control of these diseases. Pathological and normal specimens, charts, microscopic views, graphs and placards were pre-

pared for display, X-ray photographs were taken, and wax models were built. These elements were assembled into specially constructed booths for permanent exhibit purposes. They are to become the nucleus of a museum for medical students at the University, as well as forming the basis for general educational exhibits at the State Fair and for other appropriate occasions.—*Thirteenth Annual Report*, Dept. of Public Health, Illinois, 1930.

Providence, R. I.—An admirable set of health reports from Providence contains the records of the superintendent of health, the city registrar (including tables for 75 years), and the milk inspector, for the year 1930. These documents, from Dr. Charles V. Chapin, are of immense value to health administrators.

Model statistical tables, classified financial data, with comparisons for the previous year, and interesting descriptive text characterize the reports. The first step in the supervision of the health of infants is the distribution of prenatal letters to prospective mothers. During the year, 1,239 such letters were requested, 696 requests coming before the seventh month of pregnancy.

Six nurses supervise the children delivered by midwives (8 per cent of total) until they are 5 years old, making 14 calls on each well baby before it is 1 year of age, monthly calls during the second year, and 4 calls a year

thereafter. One nurse supervises the infants and young children in licensed boarding homes, and the infants of such unmarried mothers as are not under the nursing supervision of private agencies. One nursing visit is made to each infant delivered by a physician, provided the mother is not on the maternity service of the District Nursing Association or a ward patient at the Lying-In Hospital. Coöperating with the State Children's Bureau, nursing visits are made periodically to the licensed maternity homes and to day nurseries. The District Nursing Association employs on its children's service 21 staff nurses with 2 supervisors. During the year these nurses had under supervision 4,325 infants and 1,639 children, 1 to 5 years of age, inclusive. These nurses made 31,940 home visits to infants, 13,109 visits to preschool children, and 11,137 visits to 2,052 prospective mothers. Fourteen child welfare stations were maintained.

One of the features of the report of the superintendent of health is a series of tables for typhoid, diphtheria, and scarlet fever, 1884–1930, showing by years and months the cases and deaths. and by years the mortality and fatality rates from these diseases. For the past 16 years, separate data are also given for non-residents admitted to city hospitals. The city registrar's report of 127 pages contains a wealth of information for epidemiologists and health officers.



# LABORATORY

## A FURTHER NOTE ON THE DISAPPEARANCE OF BACTERIA APPLIED TO THE SKIN

JOHN F. NORTON, PH.D., AND MARGUERITE F. NOVY

*Department of Health, Detroit, Mich.*

THIS brief statement is intended to supplement results already published by the authors.<sup>1</sup> Arnold has suggested that the 10-minute interval between the application of bacteria to the skin and the first test for disappearance of the organisms does not give as striking results as when a shorter time interval is used. A series of 12 experiments was made by us, using *B. prodigiosus* as the test organism and the palmar surface of the hand as the test area. Samples were taken every minute and agar plate counts made ac-

cording to Arnold's technic. Table I gives the results.

The reduction in number of bacteria recovered is evident after 2 minutes and striking after 3 minutes. The same correlation between reduction of bacteria and apparent dryness of the skin surface, as previously reported, was observed in these tests. To determine the part the skin may have played in this reduction, tests were made in the following manner. A piece of brown wrapping paper was marked into uniform squares, sterilized; the surface

TABLE I

DISAPPEARANCE OF BACTERIA FROM THE PALMAR SURFACE OF CLEAN HANDS  
COLONIES ON AGAR PLATES

*B. prodigiosus*

Time in Minutes			
0	1	2	3
1,200	112	*0	0
2,400	2,500	1,200	*900
2,000	2,100	1,800	*31
3,000	1,000	600	*22
3,200	800	750	*430
2,100	1,070	*720	0
950	*560	0	0
2,000	2,100	1,100	*800
950	600	*230	6
2,000	1,800	640	*0
2,200	1,200	*420	1
850	—	950	1,000

TABLE II

DISAPPEARANCE OF BACTERIA FROM THE SURFACE OF PAPER  
COLONIES ON AGAR PLATES

*B. prodigiosus*

Time in Minutes			
0	1	2	3
230	1	0	0
1,800	420	195	26
162	360	7	3
210	200	4	4
260	910	3	0
450	120	204	7
1,600	1,800	0	2
780	800	*2	1
900	*116	14	26
1,200	1,500	*5	2
2,500	2,000	*51	7
2,200	2,300	*1,800	20

\* = surface apparently dry.

\* = surface apparently dry.

TABLE III

DISAPPEARANCE OF *B. typhosus* FROM THE SURFACE OF WASHED HIDE COLONIES ON AGAR PLATES

Time in Minutes			
0	10	20	30
520	66	*0	0
550	380	*1	1
350	135	*2	0
350	*0	0	0
1,200	1,500	450	*0
550	1,000	1	*0
700	*8	0	0
950	*0	0	0
650	*4	0	0
750	*1	0	0
800	390	*0	0
1,200	1,100	1,100	*0

\* = surface apparently dry.

inoculated with a suspension of *B. prodigiosus*, and the paper fastened on the dorsal surface of the hand with adhesive tape. A cotton swab was rubbed over the surface of a square at

TABLE IV

DISAPPEARANCE OF *STREPTOCOCCUS HEMOLYTICUS* FROM THE SURFACE OF WASHED HIDE COLONIES ON BLOOD AGAR PLATES

Time in Minutes			
0	10	20	30
500	—	—	60
1,000	500	400	75
750	400	100	44
300	300	450	7
—	500	125	*4
800	500	300	*27
450	400	34	*36
900	700	240	*41
100	400	*7	39
1,000	*400	320	240
520	*26	92	56
1,100	700	*500	400

\* = surface apparently dry.

TABLE V

DISAPPEARANCE OF *STAPHYLOCOCCUS AUREUS* FROM THE SURFACE OF WASHED HIDE COLONIES ON AGAR PLATES

Time in Minutes			
0	10	20	30
900	*750	350	360
1,200	*1,000	640	800
1,400	1,320	*820	900
1,500	*960	840	800
1,800	1,500	*1,300	1,200
1,000	1,200	820	*800
1,400	1,000	*780	400
1,200	600	*350	89
1,800	*800	600	500
1,500	900	*850	230
1,000	*490	25	—
1,100	850	*600	360

\* = surface apparently dry.

each 1-minute interval, and agar plates inoculated as before. The results are given in Table II.

The results are similar to those recorded in Table I except that the dis-

TABLE VI

DISAPPEARANCE OF *B. TYPHOSUS* FROM THE SURFACE OF PAPER COLONIES ON AGAR PLATES

Time in Minutes			
0	1	2	3
56	148	76	*0
350	650	*26	8
230	450	*0	1
1,800	1,800	*17	8
720	1,200	*3	4
600	650	*8	19
570	520	*0	16
350	500	*16	21
400	*250	13	15
830	950	*300	130
1,300	1,200	*22	76
1,500	*650	94	10

\* = surface apparently dry.

TABLE VII

DISAPPEARANCE OF STAPHYLOCOCCUS AUREUS  
FROM THE SURFACE OF PAPER  
COLONIES ON AGAR PLATES

Time in Minutes			
0	1	2	3
1,800	320	550	400
1,100	1,200	*900	400
1,500	1,200	*460	350
1,300	*1,400	820	190
1,200	1,000	*700	640
800	660	*155	—
1,100	900	*62	43
1,500	1,100	*600	500
1,200	1,800	*400	135
1,800	1,200	*300	550
600	400	*300	118
900	650	*115	46

\* = surface apparently dry.

appearance of the test organism was more rapid on the surface of the paper than on the hand. There is no evidence in these experiments that the skin possesses any germicidal power.

Since the disappearance of pathogenic bacteria from the skin is of far more importance than that of the non-pathogen *B. prodigiosus*, two series of experiments were made to determine how the former group of bacteria would act. *S. hemolyticus* (a strain isolated from a case of erysipelas), *S. aureus*, and *B. typhosus* were used. In the first series, tests were made on washed hide and in the second, on brown wrapping paper according to the method described above. Comparisons should be made with the data already published for *B. prodigiosus*.<sup>2</sup> Tables III to VII give the results.

Again, reduction in the number of bacteria recovered as measured by the number of colonies appearing on agar plates corresponded to the time at which the surface appeared dry. The results with *B. typhosus* were almost identical with those obtained on washed hide when *B. prodigiosus* was used. The hemolytic streptococcus survived for a somewhat longer period than *B. typhosus*. The most resistant of the organisms tested was *S. aureus*. Even after the inoculated surface was apparently dry the reduction in numbers of *S. aureus* was relatively small as compared to *B. typhosus* and *B. prodigiosus*. A similar comparison can be made on the paper surface between these three organisms.

These experiments tend to confirm our previous conclusions that the skin possesses no inherent germicidal activity, and that the disappearance of certain bacteria from the surface of the skin is largely dependent on the removal of moisture. Pathogenic bacteria are known to vary in their resistance to desiccation. The results obtained in these experiments can be explained on the basis of this variation. The two sensitive species used in these tests lose their color when stained by Gram's method. The two more resistant organisms are Gram positive. Whether or not this relationship to the Gram stain would hold for other species is not known.

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# CONNECTICUT OFFICIAL MILK SEDIMENT STANDARDS

FRIEND LEE MICKLE, F. A. P. H. A.

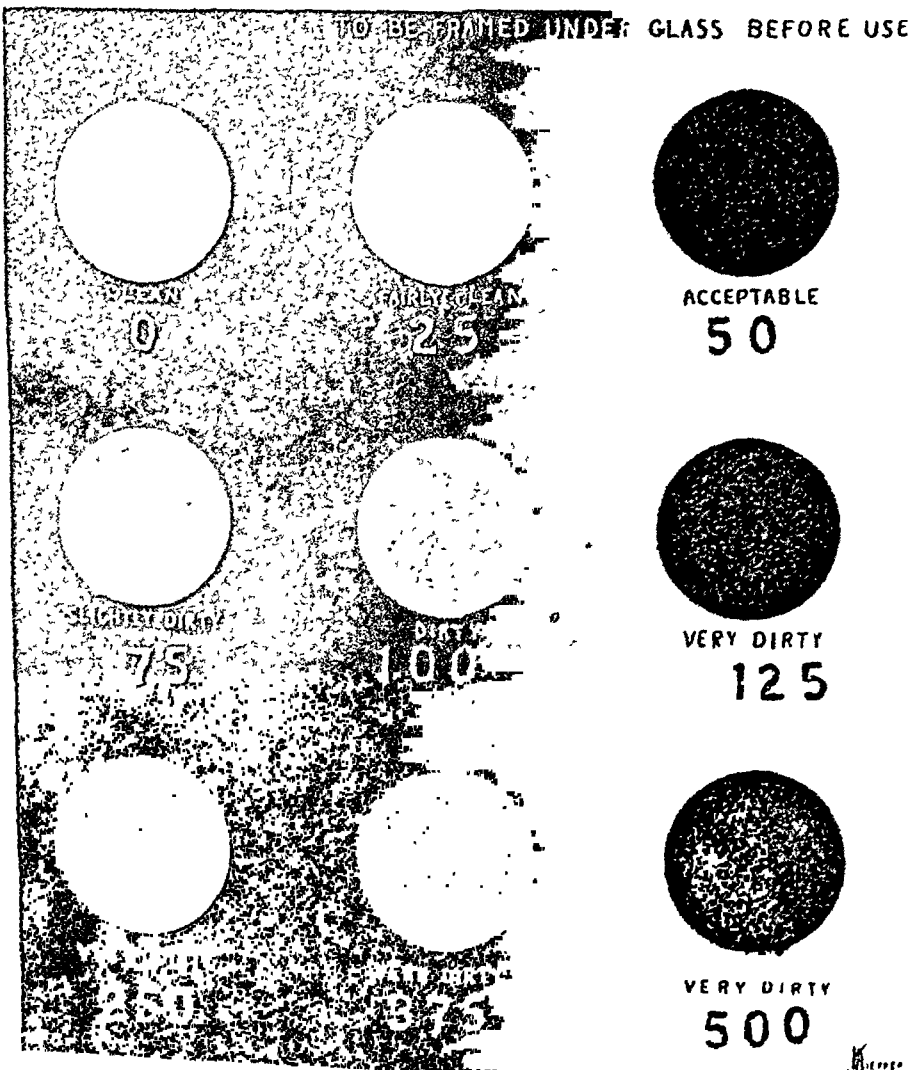
*Bureau of Laboratories, State Department of Health, Hartford, Conn.*

THE Milk Sediment Standards in use in Connecticut have recently been improved and made available for distribution. This is a photographic standard, being a marked improvement over preceding standards.

Studies made by the Bureau of Laboratories of the Connecticut State Department of Health in modifying and improving the test for visible dirt in milk and in developing a photographic Sediment Standard have been previ-

## CONNECTICUT OFFICIAL MILK SEDIMENT STANDARDS

1931



Connecticut Official Milk Sediment Standards  
This photographic reproduction of the standard is not to be used in lieu of standard in the actual grading of milk

ously reported.<sup>1,2,3,4</sup> Each laboratory in Connecticut making milk examinations has now been advised that the 1931 standards are ready for mailing. Each edition has found rather a wide use outside of Connecticut. A cut of the new standards is reproduced herewith.

The 1931 standards have several advantages over previous ones:

1. The photography is a marked improvement.

2. The diameter of the standard discs is the same as the discs to be graded.

3. The range of the standard now covers the entire range from Clean to Very Dirty on one photograph so that the one standard is applicable to both laboratory and field use for all samples of milk.

4. Both the "Cleanliness Ratings" from Clean to Very Dirty and the "Sediment Scores" are printed below the standard discs.

5. The "Cleanliness Ratings" are now more applicable to the correct grading of filtered, clarified or bottled milk.

6. The "Sediment Scores" are now design-

nated by whole numbers rather than by the small fractions that represented "milligrams per pint." Scores of 50 and below are "Clean" or "Acceptable"; scores of 75 and 100 are "Slightly Dirty" and "Dirty"; and scores of 125 or above are "Very Dirty."

Interested persons have been notified that the new 1931 standards can be purchased from the State Department of Health at Hartford, Conn., at a cost of \$1.00 each. The Director of Laboratories has requested that criticisms or comments following the use of these standards be made to him.

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1. Mickle, Friend Lee. Modified Sediment Test for Visible Dirt Adopted in Connecticut, *A. J. P. H.*, 18, 7: 926 (July), 1928.

2. Mickle, Friend Lee. Connecticut Standard Test for Dirt in Milk, *Health Bull.*, Connecticut State Dept. of Health, 42: 27, 1928.

3. Mickle, Friend Lee. Failure of Standard Method for Visible Dirt in Milk to Meet Connecticut Requirements, *A. J. P. H.*, 19, 2: 172-178 (Feb.), 1929.

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## VITAL STATISTICS

**New York State Death Rate Decreases. Nearly One-half in Four Decades—**In the course of the last forty years the general death rate in New York State was cut almost in two—from 21.4 per 1,000 population in 1890 to 11.7 in 1930. Had the death rate of 1890 prevailed last year, there would have been 270,489 deaths instead of the actual number, 147,424. In other words, the remarkable improvement in the public health represents a saving of almost 125,000 lives in the single year of 1930. The general death rate of New York City dropped 62 per cent between 1890 and 1930; upstate the rate decreased 28 per cent.

An analysis of the movement of mor-

talidity in the state in 1890-1930 according to age brings out the important fact that the reduction in the general death rate was due almost entirely to a decrease in mortality in the younger ages, under 45 years; there was but little improvement in middle life, while the death rate among older persons, over 60 years of age, has exhibited in recent years a slight upward trend.

The death rate among males was higher than among females at all ages. The total male death rate in 1930 exceeded the death rate among females by 18 per cent. In 1890 the excess mortality among males was somewhat less, 15 per cent. In 1930 the death rate among males was greater than that among females by 22 per cent in New

York City, and 13 per cent upstate.—New York State Dept. of Health, *Health News*, 8: 218 (Nov. 30), 1931.

**Annual Report of Surgeon General of Army**—Automobiles were the leading cause of death in the United States Army in 1930, according to the annual report of Surgeon General Robert U. Patterson. If it had not been for the material increase in the number of deaths from automobile accidents, the mortality rate for the year would have been the lowest on record. All but 11 of the 72 deaths from automobile accidents occurred in privately owned cars. Suicides, which, during 8 of the preceding 9 years, had led the list, were second, and tuberculosis was third, with drowning and cancer in fourth and fifth positions. The average daily strength of the army was 137,299. There were 50,910 enlistments in 1930 as compared with 61,898 in 1929. The annual hospital admission rate from all causes (608 per 1,000 men) was the lowest recorded in the history of the army. The most notable advance was in the control of communicable diseases, and especially of those transmitted through the gastrointestinal tract: typhoid, diarrhea and dysentery. The leading causes of admission were bronchitis, gonorrhea, acute tonsillitis, athletic exercises and chronic tonsillitis. The number of malarial fevers was reduced to less than 800 in each 100,000 men. During the year, 1,546,786 days were spent by the military personnel on sick report, as compared with 1,551,915 in 1929. The average daily noneffective rate from disease was 30.9 as compared with 31.3 in 1929 and 30.2 in 1928, and the leading causes were gonorrhea, tuberculosis, syphilis, athletic exercises and automobile accidents. The leading causes of disability were dementia praecox, tuberculosis, constitutional psychopathic state, mental deficiency and pes planus. The admission rate (47.7) for venereal

diseases was the lowest in the history of the army; this group of diseases caused 7.9 per cent of all admissions to hospitals and quarters, 16.3 per cent of the loss of time on account of sickness, 4.6 per cent of the discharges for disability, and about 2 per cent of the deaths. Since the inauguration of the campaign for the prevention of venereal disease in 1909, the army rate has been reduced 73 per cent. The rate for influenza was the lowest recorded since 1888.—*J. A. M. A.*, 97: 1719 (Dec. 5), 1931.

**Preliminary Report on Marriage and Divorce for the United States, 1930**—The Bureau of the Census announced that, according to the returns received, by the Department of Commerce, there were 1,128,180 marriages performed in the United States during the year 1930, as compared with 1,232,559 in 1929. These figures represent a decrease of 104,379 or 8.5 per cent. There was an increase of 4.2 per cent from 1928 to 1929. During the year 1930, there were 191,630 divorces granted in the United States, as compared with 201,468 in 1929, representing a decrease of 9,838 or 4.9 per cent. There were 4,333 marriages annulled in 1930, as compared with 4,408 in 1929. The estimated population of continental United States on July 1, 1930, was 123,191,000, and on July 1, 1929, 121,526,429. On the basis of these estimates, the number of marriages per 1,000 of the population was 9.2 in 1930, as against 10.1 in 1929; and the number of divorces per 1,000 of the population was 1.56 in 1930, as against 1.66 in 1929.

While the net decrease in the number of marriages performed in the country as a whole was 8.5 per cent, the relative change in the different states ranged from a decrease of 28.5 per cent in Texas to an increase of 29.5 per cent in New Mexico. (Only 9 states reported increases—Maine 3.9 per cent;

Nebraska five-tenths of one per cent; Virginia 1.3 per cent; Kentucky 2.1 per cent; Louisiana 1.0 per cent; Oklahoma 2.2 per cent; New Mexico 29.5 per cent; Arizona 4.2 per cent; and Nevada 6.4 per cent. Of those 9 states, 7 adjoin states in which recent changes in the marriage laws require from 3 to 5 days to elapse between the application for a marriage license and the issuance of the same. Virginia adjoins North Carolina where a law, effective July 1, 1929, applies to those under 21 years of age; Kentucky's increase is due in part to a change made in the laws of Tennessee, effective on the same date, but applicable to all parties; Louisiana, Oklahoma, and New Mexico adjoin the State of Texas where a law requiring physical examination as well became effective June 13, 1929; and Arizona and Nevada adjoin the State of California where the law became effective July 29, 1927. In the case of North Carolina and Tennessee, 5 days must elapse while California and Texas require 3 days.)

The rate of marriages per 1,000 of the population ranged from 4.6 in North Carolina and 4.7 in Delaware to 20.5 in New Mexico and 67.0 in Nevada. In general, the changes in the number of marriages per 1,000 of the population form a more satisfactory index of the trend with regard to marriage in the several states than do the actual number of marriages, because they take account of differences in the rate of increase in the general population.

In 1930, for the United States as a whole, 5.9 marriages for each divorce were reported, as against 6.1 in 1929. The District of Columbia and New York State, each having but one cause for absolute divorce, reported 57.5 and 24.5, respectively, while the rates in the other states ranged from 12.9 marriages to each divorce in Georgia to 2.3 marriages to each divorce in Nevada. The

changes in the various states as regards the number of divorces compared with the year 1929 ranged from a decrease of 19.1 per cent in the District of Columbia to an increase of 21.3 per cent in Delaware. Increased rates for divorces were reported by 9 other states, Maine, Massachusetts, Connecticut, Pennsylvania, Virginia, Arizona, Utah, Nevada and California. The ratio of divorces per 1,000 of the population in the individual states in 1929 ranged from 0.19 in the District of Columbia and 0.38 in New York to 3.22 in Oklahoma and 28.67 in Nevada.—*Prel. Report Marriage and Divorce for the U. S., 1930, Jan. 2, 1932.*

**Health Conditions in the United States, 1930**—In a report recently made to Congress, Surgeon General H. S. Cumming stated that reports of the prevalence of communicable diseases received by the Public Health Service from state health officers and preliminary reports of deaths from several sources indicate that the health record for the United States for the calendar year 1930 was exceptionally good.

The geographic distribution of smallpox in the United States is very irregular. Seven states—Kansas, Delaware, District of Columbia, Maine, Maryland, New Hampshire and Rhode Island—reported no cases of smallpox in 1930. The greatest prevalence of smallpox in that year was in South Dakota with 259 cases per 100,000 population. Indiana reported 164 cases of smallpox per 100,000 population and the State of Washington 152 cases per 100,000 population.

During the calendar year 1930 the incidence of influenza in the United States was unusually low. The death rate from influenza for the year 1930 was 18.7 per 100,000 population as compared with 54.6 per 100,000 population in 1929 and 42.1 in 1928. The fact that there was no general outbreak

of influenza during 1930 probably helped greatly in keeping the general death rate for the year low, as there is usually an increase in the number of deaths attributed to certain other diseases when influenza is prevalent.

Infantile paralysis was more prevalent during the calendar year 1930 than it was in 1928 or 1929. In the spring of 1930 the reports showed increased incidence of infantile paralysis on the Pacific Coast, and later considerable numbers of cases of the disease were reported in other parts of the country, especially in Louisiana, Oklahoma, and some of the North Central states. In the country as a whole, infantile paralysis reached its peak for the year about the first of October. An outbreak began in New York City soon after the close of the fiscal year. This outbreak later reached considerable proportions, the number of cases being considerably in excess of those reported for the preceding year.

The tuberculosis death rate for the calendar year 1930 was the lowest ever recorded by the Public Health Service. It was 68.5 deaths per 100,000 population as compared with 73.1 in 1929 and 76.4 in 1928. In 1900 the Bureau of the Census recorded a death rate from tuberculosis of 201.9 per 100,000 population. The difference between the tuberculosis death rates of 1900 and 1930 represents a saving of more than 160,000 lives in 1930 which would have been lost from tuberculosis in the United States if the 1900 rate had prevailed that year.

The prevalence of typhoid fever has been decreasing in the United States since comparable yearly statistics of cases and deaths have been available. During the calendar year 1930 a slight reaction was shown by the reports. The increase was reported during the last 6 months of 1930 and in some states at least it may have been influenced by the drought conditions which

resulted in pollution of water supplies or necessitated the taking of drinking water from new or unknown sources. The typhoid fever rates as computed from reports to the Public Health Service were as follows: 1930, 22 cases per 100,000 population; 1929, 19 cases; and 1928, 22.7 cases.

The case and death rates for diphtheria in 1930 were the lowest which the Public Health Service has ever recorded—54.2 cases and 4.9 deaths per 100,000 population. Ten years ago, 1920, the diphtheria case rate was 155 per 100,000 and the death rate was 15.3 per 100,000.

From 1924 to 1928, there was an increase in the prevalence of pellagra in the United States. In 1929 the reported incidence of the disease decreased somewhat, and there was a further decrease during the year 1930. During the first 6 months of 1931, however, 16,385 cases of pellagra were reported to the Public Health Service as compared with 13,359 cases reported during the first 6 months of the preceding year.

More than 1,450 cases of undulant fever were reported to the Public Health Service for the calendar year 1930. The disease has been recognized in every state of the Union.

Rocky Mountain spotted fever is not reportable in many of the states east of the Rocky Mountains. In 1930, 167 cases were reported from California, Colorado, Idaho, Montana, Nevada, Oregon, Washington and Wyoming. During the year workers of the Public Health Service identified, by laboratory and clinical studies, Rocky Mountain spotted fever, eastern type, in several states along the Atlantic seaboard. There is evidence to indicate its existence in this area at least since 1909. In 1931 cases were reported in the District of Columbia and Maryland.—U. S. P. H. S., *Health News*, H60.



# PUBLIC HEALTH ENGINEERING

## FACTORS IN THE ECONOMICS OF WASTE DISPOSAL

E. E. BUTTERFIELD

*Chairman of the Committee on Refuse Disposal and Street Cleaning,  
American Society of Municipal Engineers*

THE scope of this paper has been confined to several factors which I believe to be of fundamental importance for the economics of waste disposal, instead of a more pretentious attempt at a comprehensive outline of a combined system of the disposal of city refuse and sewage, in which the operating costs can be practically reduced to fixed charges and labor. A consideration of the combined system of waste disposal necessitates the introduction of the long and tedious computations of engineering thermodynamics as well as a familiarity with certain aspects of organic chemistry, which are not subjects of common parlance in waste disposal practice and literature. On the other hand, it is possible to bring into focus several outstanding features in the combined system of waste disposal and discuss them in more or less conventional terms.

### FUEL VALUE OF SEWAGE SLUDGE

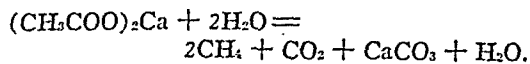
#### *Combustible Gas from Putrefaction—*

The formation of combustible gas in the putrefaction of organic matter is well known to every bacteriologist who has used a fermentation tube and the gas formulas of Theobald Smith as an aid in the identification of species of gas-forming bacteria. The colon bacillus and the gas-bacillus of Welch, which are normal inhabitants of feces and sewage,

are active gas producers. Sewage grease is an important source of methane or marsh gas in the putrefaction of sewage sludge.

In the breaking down of protein, fat, and carbohydrate by animal and bacterial ferments, fatty acids are formed as intermediary products. The fermentative production of methane and carbon dioxide from the salts of fatty acids higher than acetic, including propionic, succinic and oleic, has been demonstrated experimentally by A. M. Buswell. Acetic acid is the end product of the beta-oxidation of straight chain fatty acids with an even number of carbon atoms.

In the oxidative deaminization of amino-acids from protein, carbon dioxide and ammonia are given off, and the resulting deaminized amino-acid is a fatty acid with one less carbon atom. One of the most widely known reactions in the fermentative production of methane and carbon dioxide from fatty acids is the bacterial hydrolysis of the calcium salt of acetic acid:



As a rule, the formation of methane from fatty acids does not exceed two molecules of methane for one molecule of carbon dioxide gas or one molecule of methane to one molecule of total carbon dioxide and carbonate. Methane is a relatively insoluble gas, whereas carbon dioxide is not only very soluble but

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it also combines readily with ammonia and other bases present in sewage to form carbonates, which accounts for the fact that the limiting value of the combustible gases in the gases from sludge putrefaction is about 85 per cent instead of 66.6 per cent. It has been stated that the average production of gas from sludge digestion amounts to 0.75 cu. ft. per person per day, with an average heating value of 750 B.t.u. per cu. ft. The average figures would indicate a production of 563 B.t.u. per person per day.

The fuel value of fresh sewage sludge varies from 4,000 to 7,500 B.t.u. per lb., dry basis; the values for a particular sludge depending upon the content of inert mineral matter and of adventitious grease, the former effecting a lowering of the heating value and the latter contributing largely to the higher fuel values of certain sludges. Taking 6,000 B.t.u. as an average for heating value of sludge, dry basis, and 0.15 lb. as the daily per capita contribution of recoverable sewage solids, there would be 900 B.t.u. contributed per person per day in the form of fresh and recoverable sewage solids.

Both of the figures, 563 B.t.u. from the gases of sludge digestion and 900 B.t.u. from fresh sludge, per person per day, are subject to errors in the law of averages, and the larger the numerical data, the smaller the error. It is well known that certain anaerobic, gas-forming organisms produce hydrogen in the course of putrefaction. Small quantities of hydrogen have been reported in the combustible gas arising from the putrefaction of sludge; the presence of hydrogen in these gases would raise the heating value of the gas above the theoretical limit of one-half of the heating value of fresh sewage solids. I have simply taken available data to indicate a loss of approximately one-half of the original heating value of fresh sewage solids when the same

solids are subjected to putrefactive fermentation with recovery of combustible gases, and why. A similar conclusion has been previously advanced by M. J. Blew from a study of the fuel values of fresh sludge and of the residues from sludge digestion.

**Mosquitoes Transported by Airplanes**—This paper briefly recites the growing public health interest in the possible importance of the transportation of mosquitoes by aircraft and the determination of the U. S. Public Health Service to answer the much propounded questions as to whether mosquitoes "are carried in airplanes, and, if so, to what extent, the distance of such transportation, the species of mosquitoes, and the types of planes on which they are carried."

Daily inspection of all airplanes arriving at the Miami, Fla., ports of the Pan American Airways System were made from July 23 to September 18, 1931. There were three types of airplanes: trimotor Fokker, Sikorsky Amphibian, and Commodore hydroplane—all cabin airliners.

Fokkers fly between Havana and Miami daily, between San Juan, P. R., and Miami three times a week, stopping at Santo Domingo, Port au Prince, Haiti, and Camaguey, Cuba, on the north-bound, 1-day trip. Sikorskys operate between San Salvador, Salvador, and Miami, stopping at Tela, Belize, Cozumel, and Havana (over-night). Commodores operate between Cristobal, C. Z., and Miami, stopping at Barranquilla, Colombia; Kingston, Jamaica (over-night), and Cienfuegos, Cuba.

From July 23 to September 12, there were 102 inspections made, and 29 mosquitoes captured, 1 male *Aedes aegypti* and 28 *Culex quinquefasciatus*. Representatives of the following species had been captured on the airplanes up to the time of the publication of the paper: *Aedes aegypti*, *Culex quinque-*

*fasciatus*, *Mansonia titillans*, *Aedes taeniorhynchus*, and *Anopheles albimanus*. The "Do-X" was also inspected and 4 mosquitoes were found aboard.

Very exact and conclusive experiments were conducted, wherein "laboratory-bred" mosquitoes were stained and placed aboard trimotor Fokker cabin planes at San Juan, P. R., just before leaving for Miami. *Aedes aegypti* (with a few *Culex quinquefasciatus*) were used. These, in cloth cages, were stained by spraying with an atomizer, using a 2 per cent watery solution of yellowish, water-soluble eosin, and about 20 c.c. of dilute stain for each cage of 30-40 mosquitoes.

The stained specimens were put aboard the plane on each of three successive trips, being liberated in all compartments just before the passengers got aboard and the plane took off. These planes leave early in the morning and arrive in Miami the afternoon of the same day, stopping at Santo Domingo, Port au Prince, and Camaguey, the time of stops aggregating more than an hour, and the flying time from San Juan to Miami being approximately 10 hours.

Of 40 mosquitoes (mostly *Aedes aegypti*) put aboard at San Juan on September 13, 13 were recovered from the plane on landing at Miami; 3 of 30 specimens placed aboard on September 16, and 6 of 30 placed aboard on September 18, making a total of 22 of the 100 stained specimens liberated on airplanes at San Juan which were recovered at Miami on the afternoons of the days of flights.

One of the investigators made the round-trip flight from Miami to San Juan and reported only 1 mosquito biting *en route*, and this at an altitude of approximately 3,000 feet. In identifying stained specimens, a solvent composed of glycerine 4 parts, absolute alcohol 4 parts, and ether 1 part was

used. Each mosquito was covered with a drop of the solvent and a tinting of the drop occurred if the specimen was stained.

A description of a power suction apparatus devised by the authors for capturing mosquitoes is given. Cuts showing types of airplanes, mechanical collecting device and staining procedure accompany the article.

The authors' conclusions are, briefly: (1) where airplanes may become heavily infested it may be expected that approximately one-fifth of the original number of *Aedes aegypti* will be carried for a distance of at least 1,250 miles. with repeated landings and opening of doors, hatches, etc.; (2) ordinarily, small numbers of mosquitoes are carried, but one infected mosquito might "start an epidemic," but "this mode of introduction of mosquito-borne disease is probably secondary in importance to the importation of infected man"; (3) "there is no obstacle to the efficient treatment of airplanes so as to destroy mosquitoes and avoid retardation of air traffic progress."—T. H. D. Griffiths and J. J. Griffiths, *Pub. Health Rep.*, 46, 47: 2775-2782 (Nov. 20), 1931.

**Sewage Reclamation Plant for Los Angeles**—In order to study sewage reclamation, the City of Los Angeles placed in operation on May 12, 1930, an experimental sewage treatment plant of 200,000 g.p.d. capacity. The purpose of the plant includes:

1. Development of a scheme of treatment which will not be a nuisance nor produce any odors, and will advance utilitarian values to a maximum.
2. Embodiment into one plant of all the best ideas as obtained from visiting other plants throughout the country and gleaned from accounts in the literature of foreign plants.
3. Utilization of mechanical equipment to the fullest possible extent.
4. Investigation into the treatment of industrial wastes.

5. Determination of basic design data for known process of treatment adapted to local conditions of climate, degree of treatment required, and character of sewage to be treated.

6. Demonstration of the degree of treatment required for each proposed scheme of reclamation.

7. Selection of a compact design consistent with simplifying operation.

8. Investigation of any harmful constituents in sewage which might interfere with various schemes of reclamation.

9. Reduction of operation costs to a safe minimum, with installation costs kept within reason.

10. Determination of installation and operation costs applicable to large plants, including labor, power, chemicals, depreciation, research, maintenance, miscellaneous items and contingency.

11. Studies on the recovery of power from gas, fertilizer from digested sludge, and the value of nitrogen in the activated sludge effluent.

12. Construction of a plant such that inspection by the public would gain their confidence and support.

There is a rather complete and interesting description of this undertaking, with sample record forms and photographs. The subject is discussed under the following headings: (1) Design of plant; (2) description of plant; (3) intake works; (4) sedimentation works; (5) aeration and sedimentation; (6) filtration of final effluent; (7) spreading grounds; (8) sludge disposal; (9) cost data; (10) what the plant is accomplishing.—R. F. Goudey, *Western Construction News*, 5, 20: 519-525 (Oct. 25), 1930. From *Pub. Health Eng. Abstr.*, Jan. 17, 1931. Abstr. A. L. Dopmeyer.

## FOOD AND NUTRITION

**The Fate of Carotene after Absorption in the Animal Organism—**Variations in the growth rate in response to carotene administration led to an investigation as to the effect on absorption of the character of the diet. Three types of basal diets were used, one, fat-free, another, low in fat, and the third, a fat containing diet.

Daily supplements with irradiated ergosterol and brewer's yeast were given and definite amounts of carotene administered after vitamin A deficiency became apparent. Carotene was administered either in ethyl laurate or palm oil and the excretion of the pigment was tested colorimetrically. As the absorption of carotene was measured by the character of the excreta, the colorimetric and spectroscopic examination of the fats extracted from the feces and from the caecum content was made.

The examination revealed that the yellow color of the fecal fats was entirely due to carotene but in the caecum content carotene accounted for approximately only 50 per cent of the color. The balance of the fat was similar to vitamin A.

Experiments to determine whether this was vitamin A derived from carotene by bacteriological action were negative in most cases, although probable evidence was found in two cases. The importance of the diet was indicated by the rats which when fed on a fat-free diet excreted 90 per cent of the pigment when administered in ethyl laurate. Absorption was better with carotene in palm oil and nearly complete when the basal diet contained 10 per cent of fat. On the basis of the evidence of the investigators that the liver plays an important rôle in the con-

version of carotene into vitamin A, an attempt was made to accomplish this with liver tissue *in vitro*, but without success. Further experiments by perfusing the livers of healthy, young cats with carotene solution were undertaken. In these cases the reserves of the cat in vitamin A had been depleted with appropriate feeding. No evidence of any conversion of carotene to vitamin A was obtained from any period up to 17¾ hours. The administration of carotene by mouth to the cats depleted of vitamin A showed no appearance of vitamin A in the liver or blood up to 40 hours. While a large proportion of carotene was unabsorbed, evidence indicated that the pigment entering the tissues was converted into other substances.—Bashir Ahmad, *Biochem. J.*, 25: 1195, 1931.

**Some Biochemical and Physiological Aspects of Copper in Animal Nutrition—**The increased importance attached to traces of certain metallic elements in food led to this work which was undertaken for further information as to the rôle of copper. While copper has been widely observed and recorded in plants no evidence has been offered as to its function in plant life.

No evidence was adduced by this work that copper bears a direct relation to chlorophyll. Analyses of the copper content of insects and marine animals are given showing an outstanding proportion of copper in the ink sac of the octopus. As no copper is found in the ink itself, the conclusion is reached that copper performs a catalytic function in the production of melanin. A study of the copper content of land animals, in-

cluding three human specimens, indicated that in spite of individual variations, the organs, as to their content of copper, ranged as follows: liver, kidney, heart, lungs, and spleen.

Copper was found in all tissues of the animal body including skin and hair. The copper content of the skin and of the livers of rats increased in relatively small degree compared with the additional copper in the diet.

A study was made on rats of hemoglobin building from inorganic iron, alone or with various supplements. Anemia was produced by cow's milk and the effects of the supplements measured by response in hemoglobin content of the blood. Rapid hemoglobin regeneration was found with copper supplements and rats became anemic when the iron supplements were stopped, notwithstanding a considerable store of iron in the liver, but when copper was fed hemoglobin regeneration followed, indicating the belief that copper feeding brought about utilization of the stored iron in the liver.

The mechanism of the copper reaction is explained on the basis that copper feeding increases the proportion of organic to total iron in the liver and that the change from inorganic to organic is a step in hemoglobin formation, achieved probably by a preliminary formation of a copper porphyrin and subsequent replacement of copper by iron.

The author found that the presence in the diet of over 100 times the normal amount of copper (as copper sulfate) had no detrimental effect on the growth, and normal young could be produced. The same amount as copper acetate or as verdigris was not toxic but no litters were produced by the animals receiving verdigris.—Ira James Cunningham, *Biochem. J.*, 25: 1267, 1931.

**Use of Ethylene (T-Gas) in the Destruction of Pests in the Presence of Foods**—From tests on nu-

merous foodstuffs it is established that the destruction of pests (in rooms or containers used for the storage of foodstuffs) by means of ethylene oxide in concentrations up to 320 g. per cu. m. has no adverse effect on the quality or flavor of the foods provided that the space treated is thoroughly aerated after treatment.—T. Sudendorf and E. Kröger, *Chem.-Ztg.*, 55: 550, 1931. Abstract, A. R. Powell, *J. S. C. I. Brit. Chem. Abstr.*, B, 50: 904 (Oct. 2), 1931.

**Vitamin C in the Orange and the Grapefruit**—This study of the relation between antiscorbutic potency and biological activity of the plant was conducted on Palestine oranges and grapefruit from British Honduras and from South Africa, and was continued through 2 seasons, using the same group of trees. The vitamin assay was conducted usually for 90 days and during the test oranges were stored at a temperature of about 15° and the juice expressed daily for the dosage. Chemical analyses of the oranges both seasons showed a range of acidity from 0.33 to 1.37 and the soluble solids citric acid or maturity ratio varied from 6.8 to 35.4. Practically no difference was revealed in the antiscorbutic potency of these oranges and the weight curves were normal.

A similar procedure was followed in the case of grapefruit from British Honduras which showed an acidity ranging from 0.58 to 1.18. No change in antiscorbutic potency during the time of these tests was noted. The same variety of grapefruit (Marsh) from South Africa was assayed. This showed a higher acid content than the same fruit from British Honduras. The vitamin potency, however, was of the same order in both cases. Another variety (Duncan) on one test only was found to be somewhat more active than other grapefruit and the vitamin C content of grapefruit was rather higher than that

of the Palestine oranges. The authors find no correlation between the soluble solids, acidity content, pH of the juice and its antiscorbutic potency.—Mary Forrest Bracewell and Sylvester Solomon Zilva, *Biochem. J.*, 25: 1081, 1931.

**Experiments on Nutrition. X. Comparative Vitamin B<sub>1</sub> Values of Foodstuffs. Cereals II**—The experiments here reported were made with pigeons. The food was made into pills of white flour and the test grain which was ground finely in a coffee mill. Later in the experiment 1 per cent of cod liver oil was included so the birds would not suffer from a shortage of fat-soluble vitamins. Fishmeal was used to supply protein and mineral salts. A series of tables are given showing the details of each cereal tested. The comparative vitamin B values of the cereals tested are as follows:

	Percentage amount in diet for maintenance	Comparative vitamin B value
Dried yeast	4	100
Marmite	6	67
Wheat germ ("bemax")	6-7	62
Middlings	10	40
Baker's yeast	12	33
Bran	20	20
Buckwheat	20	20
Millet	30	13
Oatmeal	35	11
Wheat	40	10
Barley	40	10
Malt	40	10
Rye	40	10
Dari	40	10
Brown rice	40	10

Robert Henry Aders Plimmer, William Henry Raymond and John Lowndes, *Biochem. J.*, 25: 691, 1931.

**The Latest Work on Alleged Injurious Effects from Food Prepared in Aluminum Utensils**—Professor Lehmann, in line with a former article (*Archiv für Hygiene und Bakteriologie*, Bd. 102, 1929, S. 349) calling attention to the worthlessness of the statements of Held and Betts, offers critical ob-

servations on the later articles described as "Aluminum Food Poisoning" by Betts and Held and other authors. He finds no proof of injurious effects on health of small amounts of aluminum.

The few records of sickness at the most can only lead one to believe that only a small number of people are made sick by the ingestion of small amounts of aluminum. There is still lacking definite proof that the symptoms are chiefly traceable to aluminum or that any considerable number of people possess a hypothetical idiosyncrasy toward aluminum.

The views of a greater number of authoritative individuals agree with this conclusion. The fact that isolated individuals might be injured by traces of aluminum does not offer a basis for opposition to the use of aluminum utensils and no legislation has so far taken cognizance of these very widely distributed cases of specific sensitivity to food.—Prof. Dr. K. B. Lehmann, *Arch. f. Hyg.*, Band 106, Heft 6 (Sept.), 1931.

**The Evidence of Aluminum and the Aluminum Content of Foods**—In preparation for the criticism of the work of Held and Betts published in *Archiv für Hygiene und Bakteriologie*, Bd. 102, 1929, S. 349, analytical methods for determination of small amounts were studied and continued during the past 2 years for improving the methods. These methods are described, and using these methods the aluminum content of a variety of natural animal and plant substances is given, including foods and certain animal organs, including human organs. Results of the author are also compared with the findings of other investigators.—Prof. Dr. K. B. Lehmann, *Arch. f. Hyg.*, Band 106, Heft 6 (Sept.), 1931.

# INDUSTRIAL HYGIENE

**Portable Motor-Driven Impinger Unit for Determination of Sulphur Dioxide**—This brief contribution describes an apparatus for the sampling of the atmosphere for sulphur dioxide gas. The essential collecting portion of the instrument consists of a modified Greenburg-Smith impinger apparatus through which the atmosphere is aspirated by means of a vacuum pump.

The novel form of the apparatus consists in the modified form of the impinger flask which in this case is approximately 25 cm. long and 10 cm. wide at the widest portion. The complete apparatus is mounted in a case 7" x 9" x 19½".

Normal sodium hydroxide is used as the collecting fluid. This is neutralized with 6 c.c. normal hydrochloric acid after which it is titrated with 0.001 normal iodide. A table is presented for the conversion of the c.c.'s of iodide solution used into c.c.'s of sulphur dioxide at various temperatures.—*J. Indust. Hyg.*, XIII, 10: 338-342 (Dec.), 1931.

L. G.

**The Production of Carbon Monoxide from Paint in Sealed Compartments**—In a series of laboratory as well as practical experiments conducted on battleships it was found that the air in hermetically sealed spaces contained traces of carbon monoxide. In general the amount of this gas was found to vary to some extent but usually was present to the extent of 0.3 per cent or less. It was concluded from these studies that the source of the carbon monoxide was the boiled linseed oil used in the making of the paint which coated the interior surfaces of the dead spaces aboard battleships. The presence of carbon monoxide in these stud-

ies was demonstrated by both chemical and biologic methods. The biologic tests consisted of animal experiments, while in some cases the Hartridge reversion spectroscope was used.—*J. Indust. Hyg.*, XIII, 10: 333-337 (Dec.), 1931.

L. G.

**Heat Cramps in Industry: Their Treatment and Prevention by Means of Sodium Chloride**—This very interesting contribution presents a review of the literature of heat cramps and describes a typical attack in much detail. The symptoms in addition to the cramps are chiefly an increase in temperature, pulse rate, blood pressure, an increased blood concentration, increased sweating, hyperpnea, increased metabolic rate, a falling in body weight, and certain vasomotor changes.

The author attributes to Dr. J. S. Haldane the suggestion that the cramps suffered by miners are due to salt loss.

In certain factories under the author's supervision, the use of salt began in 1926. At first it was used in small amounts, later the amount was increased to 10, and still later to 16 grains in the form of hard tablets. The salt must be readily available, and containers are described and pictured which are in use at the drinking fountains for the ready supply of the material.

The statistical evidence showing the elimination of heat cramp due to the ingestion of salt is not very satisfactory since the reporting of minor heat cramps is usually not completely carried out. In a general way the author points out that in certain large plants under his supervision the incidence of heat cramps has fallen very dramatically from the year 1928 to the year 1930, during



which time this salt technic was in use.

The most important factors in the production of heat cramps are high temperatures and high humidities coupled with low air motion; that is, factors which interfere with the heat loss from the body. Alcohol, inadequate sleep, inadequate food, and intercurrent disease predispose to heat cramps. Finally it is agreed that heat cramps are readily relieved by the administration of salt solution.—*J. Indust. Hyg.*, XIII, 10: 347-360 (Dec.), 1931. L. G.

**Report of the Division of Industrial Hygiene, Ontario, 1930**—It is felt that very limited application to industry has been made of the results of investigations regarding the reduction of general sickness in industry, and to optimum methods for performing common tasks such as the moving of loads by hand, etc. The medical supervision for the control of industrial diseases usually results in measures for the control of general sickness.

In investigations, 361 workmen were physically examined with the X-ray, practically all of some years' experience in their trades, covering iron moulders and grinders, porcelain workers, and cement workers. These presented 30 cases of silicosis and 8 cases of tuberculosis. The few cases among moulders arose only after 20 to 30 years' work in the trade. There were a few interesting cases of fibrosis among grinders exposed to artificial grindstone dust and 1 case with exposure to talc dust only.

Examinations of 176 workers from other sources included 100 claims for silicosis and 31 for lead poisoning, referred by the Workmen's Compensation Board. In the remainder of this group there were 10 cases of arsenic and 8 cases of chromium poisoning. In connection with these various cases hundreds of microscopical examinations were made, about 80 quantitative deter-

minations for lead and 40 for silica. Plant investigations likewise required analyses of paints, the dust content of air in granite cutting shops, lead contamination of fruits, poisoning from electric refrigerants, the efficiency of equipment for spray painting, carbon monoxide content of air, etc. Four deaths from gas in a sewage disposal plant proved to be due to hydrogen sulphide.

The records of sickness of 8,000 school children over a 2-year period are being studied in relation to ventilation, age, sex, and weather conditions on sickness rates and the relation, if any, of teachers' sensation of comfort and actual atmospheric conditions.

The division was represented at the International Silicosis Conference in August, 1930, at Johannesburg, South Africa.—J. G. Cunningham, Director, Division of Industrial Hygiene, Ontario, *Annual Report*, Dept. of Health, 1930, pp. 42-43. E. R. H.

**Chrome Poisoning with Manifestations of Sensitization**—Systemic chrome poisoning is seldom reported despite the fact that some of its compounds are markedly toxic. Chromium itself is non-toxic, but the oxides, acid, and alkaline chromates are directly poisonous as well as powerful irritants on account of their oxidizing properties.

The chief industrial uses of chromium are in dyeing, colored crayon and paper manufacture, inks, plating, and the graphic arts. The workers may be subjected to these compounds as liquids, dust, or vapors.

The symptoms of poisoning and researches on the toxicity of the compounds are described. Striking evidence of absorption from the skin occurs—12 fatalities being cited in the literature from the use of an ointment containing chrome. Acute renal blocking, muscular twitching, and febrile reactions due to infection or necrosis are

outstanding symptoms, but chrome workers suffer especially from dermatitis and rarely from chronic systemic poisoning.

The case here reported was that of an American, aged 25, who entered the hospital February 3, 1930, complaining of ulcers on the hands, difficult breathing and extreme tenderness of the muscles of the extremities. His history showed that he was a subject of hay fever and asthma previous to his employment in a plano-graphic printing establishment 8 months before, where he washed sheets of zinc which had been treated with ammonium bichromate. Skin lesions developed shortly after he began work, causing him to be transferred to another department, when these promptly cleared up. About 1 month before admission he returned to his original work and almost immediately skin eruptions developed. The clinical findings of the case are detailed, notably: marked redness, tenderness, minute vesicles, respiratory wheezes, leucocytosis but no eosinophilia, fever, and acute nephritis with glycosuria, but chromium was not demonstrated in the urine. The patch test applied to the forearm was positive.

The absorption of chrome in this case was probably exclusively through the skin, as there were no lesions in the nose or throat and no digestive symptoms.

Pearce and Sawyer succeeded in producing acute nephritis in dogs by the injection of serum from animals in which experimental chrome nephritis had previously been induced. It is evident in this case that the patient's serum was peculiar, since it contained some substance capable of causing a marked reaction in human controls when injected into the skin.

Despite the complicated picture presented by this case, it seems probable that it may be explained as due to general sensitization to chrome whereby a

comparatively mild exposure produced poisoning.—Adelaide Ross Smith, *J. A. M. A.*, 97: 95-98 (July 11), 1931.

E. R. H.

**The Dust Hazard in the Abrasive Industry: Third Study**—This study reviews the incidence of pulmonary tuberculosis among the employees of a factory devoted to the manufacture of synthetic grinding wheels. The dust in the workroom air is composed of aluminium oxide and silicon carbide.

In all there have been 42 cases of active pulmonary tuberculosis in the plant under consideration in the 13-year period from January, 1918, to December, 1930. The average number of employees during this period was 2,460. Twenty-seven of these cases occurred in persons not exposed to a dust hazard, while 13 occurred among persons exposed to dust. The time of onset varied from 1 year to 21 years. Excluding 4 cases following acute influenza, the proportion of cases occurring in dusty trades was 1½ times that occurring in non-dusty occupations. In spite of this the rate of pulmonary tuberculosis for the factory as a whole is a trifle above that reported for the City of Worcester, Mass., the location of the plant.

The only conclusion which the author desires to draw is—"it is not advisable for persons who have had pulmonary tuberculosis to work in a department in which large amounts of artificial abrasive or any other dust are present."—*J. Indust. Hyg.*, XIII, 10: 343-346 (Dec.), 1931.

L. G.

**The Silicosis Act in Quebec**—The Silicosis Act, 1931, came into force in Quebec, September 1, 1931. The Act requires every person employed in the cutting, polishing, or finishing of granite to have a certificate of fitness from a medical examiner appointed under the Act, which must be renewed annually.

The employer must furnish masks or

other safety devices as are approved by the Minister of Mines as a protection against silicosis and take such precautions as the Minister may prescribe.

An amendment to the Mining Act which also came into force on September 1, 1931, requires every worker employed underground in any mine, or applying for such work, to be examined for silicosis at least once in every 12 months by a medical officer appointed under the Workmen's Compensation Act. If the medical officer finds the worker to be free from tuberculosis of the respiratory organs, he shall deliver to him a certificate of fitness. A similar certificate is required of workers engaged in any ore or rock crushing operation at the surface of a mine except where the rock or ore is crushed in water, or a solution, and kept constantly moist.

The director of mines may exempt from these provisions any mine which does not contain silica in quantities likely to produce silicosis, or which for any sufficient reason he deems should be exempt. The Lieut.-Governor in Council may make regulations prescribing the nature of the medical examination and the form of the certificate. Workmen who are employed underground for less than 50 hours per calendar month are exempt from the provisions of the Act. Penalties are provided for contravention of the Act.—International Labour Office (League of Nations), *Indust. & Labour Inf.*, XXXIX, 13: 414 (Sept.), 1931.

E. R. H.

**Pneumonia in the Native Mine Workers of the Witwatersrand Goldfields**—This is a bacteriological and epidemiological study. In the mines, conditions of work differ from section to section and from shaft to shaft, while there is, in addition, a well recognized racial or tribal susceptibility to respiratory infections among the na-

tives, pneumonia in the recruits from the more tropical regions being greater than in those from South Africa. In 1929, the average monthly death rate from pneumonia, in a population of some 200,000 natives employed on mines, was 0.28 per 1,000. Nearly half of all deaths was due to diseases of the respiratory tract (other than silicosis and tuberculosis), and pneumonia was responsible for a third of the total mortality from disease.

Ceaseless effort in reducing pneumonia has proceeded since 1907 in the matter of improvements in mining and housing conditions and in the use of prophylactic pneumococcal vaccination, with a large measure of success so that the mortality rate from lobar pneumonia of 12 per 1,000 per annum in 1907 was only 3.36 in 1929, a reduction of about 75 per cent. Sir Almroth Wright and his coworkers began the prophylactic immunizations in 1911 and 1912, while Lister succeeded in classifying the types of pneumococcus responsible in 1914, and in introducing mass inoculation experiments in 1916. The incidence and mortality rates in lobar pneumonia were definitely and markedly reduced in the mines where these measures were used, including open workings as well as those underground. In 1917, mass inoculation of nearly all the native mine workers on the Witwatersrand was established as a routine.

(A considerable discussion on the bacteriological aspects and seasonal incidence of pneumonia, differences in local mining communities, and discussion of prophylaxis by vaccine follows, accompanied by tables and charts.)

It is concluded from all of the evidences gathered that a modified form of the one-time classical lobar pneumonia occurs frequently now. In this type of case there is a varied bacterial flora with or without the pneumococcus, and against this form the polyvalent pneumococcal vaccine is to a large extent

ineffective. The two peaks of high mortality occur in the winter and spring, apparently a different bacterial flora being present in each. From the constant change in the strain responsible there is need for periodically altering the bacterial elements of the prophylactic vaccine used against pneumonia, as well as to study the different strains in different localities.—David Ordman, *J. Med. Assn. of South Africa*, 5: 108–116 (Feb. 28), 1931. E. R. H.

(The above abstract should be compared with that which follows.)

In medical circles on the Rand there are conflicting views on the subject of pneumonia among mine workers. For years a system of prophylactic vaccination has been followed, but now it has been alleged to be of little value. Vaccination was almost universal on the Rand from 1917 to 1927, but today it is no longer so general, as many mine medical officers believe that vaccine prophylaxis is not a protection against the disease, although Sir Spencer Lister, who introduced the procedure, still does not hold this view. It is claimed that there are some discrepancies in diagnosing while no classification has been generally accepted.

The theory that pneumonia has changed its character on the Reef during the last 10 years is one that seems to be possible, but there is no evidence in favor of it. Mutability in the pneumococcus is of course known, but its extent and significance are little known.

An interesting fact is that although the incidence of the disease among mine natives appears to be high, the case mortality is decidedly low. This raises the suspicion that many cases of pneumonia are not really pneumonia but acute bronchitis. On the Rand the case mortality is 11; in Europe and America it is at least double that figure for patients of the same age as the average mine operative.

—Cape Town Letter, *J. A. M. A.*, 97, 16: 1164–1165 (Oct. 17), 1931.

E. R. H.

**Silicosis in South Africa**—This 44-page bulletin reprinted from the *Proceedings of the Transvaal Mine Medical Officers Association* held at Johannesburg, October 23, 1930, contains 3 papers by as many different authors, accompanied by 32 pages of half-tone plates.

The first paper by F. W. Simson, Department of Pathology, South African Institute for Medical Research, Johannesburg, is entitled "The Histo-Pathology of Silicosis," and considers the essential anatomy of the lungs, the lymphatic apparatus involved in silicosis, the relative changes as the result of dust inhalation, i.e., early reactive, the silicotic islet of non-infective types, and reactions to "infective silicosis."

The second paper is by A. Sutherland Strachan of the same department and is entitled "The Pathological Anatomy of Silicosis," the sub-headings being: Changes in the root glands, changes in the pleurae, changes in the lung substance, silicosis of "simple type," silicosis of the "infective type," and complications.

The third paper is by L. G. Irvine, Chairman of the Miners' Phthisis Medical Bureau, Johannesburg, and is entitled "The Correlation of the Pathology, Radiology and Symptomatology of Silicosis," the sub-headings being: Criteria of diagnosis, some preliminary considerations in the pathological diagnosis of silicosis, occupation of the lung by dust, terminology adopted under the Miners' Phthisis Act, silicosis—the "simple type," early stages, later stages, the "infective type," and tuberculosis with silicosis. Then follows a classification of radiographs adopted by the Medical Bureau and their interpretation including the blank to be used for reporting X-ray findings in various stages with cross-references to the accompanying plates, also a great deal of descriptive matter regarding the radiographs reproduced.

Dr. Irvine likewise indicates the radiographic technic employed at the Medical Bureau, the legal aspect, incidence, and prognosis in cases of silicosis, with some comparative data for European and native mine laborers.

E. R. H.

**Safety and Health in Tunnel and Caisson Work**—Two tables show the compensation statistics for tunnels, shafts, subways, and caissons, showing that caisson disease appears to be the most prominent and serious cause of accidents.

The general discussion covers in a code manner, supervision, and personnel, guarding machinery, fire protection, sanitation (wash houses, lockers, bathing and toilet facilities, drinking water, etc.), explosives, the matter of hand tools, electrical installations, haulage, and first aid; also the reporting and investigating of accidents and bulletin board services.

Among the safety features, four paragraphs are given to ventilation with significance standards as follows:

	Per cent
Carbon monoxide to be less than	.005
Carbon dioxide to be less than	1.00
Methane to be less than	.25
Hydrogen sulphide to be less than	.001
Oxygen to be more than	19.00

"Work in compressed air" considers the definition, cause and treatment of compressed air illness, while special stress is laid upon requirements for compressed air workers, their selections, health regulations, health suggestions, etc.

A section is devoted to compressed air equipment and other sections to air pressure, compression, decompression, hours of labor, communication, sanitation and ventilation, etc. A convenient

table shows relation between pressure and hours of work to be permitted. Seventeen illustrations accompany.—National Safety Council, Chicago, *Industrial Safety Series* No. Con.-2, 12 pp., 1931. E. R. H.

**Correspondence Committee on Industrial Hygiene, International Labour Office**—A number of members of this committee met at the headquarters in Geneva, July 30 to August 1, 1931, including representatives of some dozen countries. Proposals were submitted for the drafting of international relations to prevent anthrax infections in industries other than that of hides and skins, mainly referring to the handling of bones, hoofs, and horns.

The risks of lead poisoning in the process of enameling by powdered lead on cast iron were discussed, also the dangers of toxic solvents. The meeting recommended that all cases of poisoning occurring in the chemical industry be notified to the International Labour Office, which should hand on the information to interested parties. A program of research into the dangers of solvents was drawn up.

Every country was recommended to draw up regulations governing work in accumulator (storage battery) factories.

The conditions of work of married women were discussed and an approval was made to a proposal submitted by the Belgian Government to undertake an inquiry into this question in all of its aspects.

The meeting considered the conclusions of the International Silicosis Conference held at Johannesburg in 1930 and made suggestions regarding further research work on silicosis.—International Labour Office (League of Nations), *Indust. & Labour Inf.*, XXXIX, 6: 181 (Aug. 10), 1931. E. R. H.

## CHILD HYGIENE

THE most complete and unique report which has come to our attention recently is the annual report of the Los Angeles County Health Department for the fiscal year 1930-1931. It covers in detail all the work undertaken and accomplished, together with a complete financial statement including source of income and expenditures. The report is especially informative because it has clear-cut descriptions of each phase of the work. It contains excellent tables and charts which are easily read.

Dr. J. L. Pomeroy, the County Health Officer, states, "The year 1930-1931 will go down in history as one of the most healthful on record." The death rate was 10.4 per 1,000, compared with the rate for the United States as a whole of 11.3, and that for the State of California of 11.5.

The report reveals great progress in the control of many infectious diseases, especially those of childhood, and a marked reduction in deaths of infants under 1 year of age. It states the most outstanding achievement of the department has been the great reduction in deaths of children during the first year of life.

In spite of the fact that the Mexican babies make up 31 per cent of the total, the results of our health education work have been most successful. A series of charts is shown giving graphically this remarkable story. We do not believe any district in the country can show a more striking picture. The charts conclusively demonstrate the soundness of our program and the returns of the investment of taxpayers' money.

The infant mortality rate in Los Angeles County for 1930 was 46 per 1,000 as against

a state rate of 57 and a Los Angeles City rate of 62. Thus while the rate was 92 in Los Angeles County for 1916, and the state rate and City of Los Angeles rate was 73, due to more intensive and efficient work of the County Health Department we have reduced our rates lower than either Los Angeles City or the State of California. These reductions have been accomplished against the great obstacles of a large, scattered population, a very high Mexican population and the almost total absence of the many welfare, health and other social organizations so helpful in a large city.

The reduction effected shows for all races and all causes. Thus congenital malformations have been reduced nearly 6 per cent, as reflected by a marked reduction of deaths during the first month from 33 per 1,000 to 22 per 1,000. Gastrointestinal deaths have been reduced by over 50 per cent, falling from 22.4 to 10.0 per 1,000 from 1916 to 1930. Respiratory diseases dropped 40 per cent, falling from 15 to 9 per 1,000; communicable diseases declined from 14 to 2 per 1,000, a fall of about 600 per cent. All other causes fell from 10 to 8 per 1,000, a reduction of about 20 per cent. The grand total reduction has been 50 per cent from all causes.

The natural question to ask is, "How have such successful results been obtained?" This has been due largely to the excellent organization and efficient management of the Los Angeles County Health Department over 15 years. During that time the County Health Officer has developed gradually an organization which covers the health needs of the entire county in such a manner that each locality is given special attention. There are 12 district health officers coöperating with 35 cities and rural parts of the county.

The maternal and child health functions have been given special attention. Under the capable direction of Dr. Anna E. Rude this phase of the work has advanced remarkably during the last 3 or 4 years. Last year the Bureau

of Maternal and Child Hygiene "made up 15.8 per cent of the costs of salaries and mileage, 12.2 per cent of the costs of maintenance and operation, and about 11 per cent of the total per capita costs. A total of 19.1 cents per capita was expended on this function."

The total per capita expenditures for health services in the Los Angeles County Health Department for the fiscal year 1930-1931 was \$1,218,064 or \$1.72 per capita.

There are now 87 Child Hygiene Conferences throughout the county, at which mothers are free to bring their babies for advice to keep them well. Nearly 65 per cent of the mothers are reached at some time during the year. At these conferences the rules of hygiene for childhood are taught and demonstrated, special classes are held on nutrition and foods and health habit training, and the mothers are urged to keep the child under the observance of the family physician at the approach of the slightest illness. Babies are also vaccinated against diphtheria and smallpox. Nurses visit the homes to see that the rules are carried out, and to check up on sanitary conditions. Special work is done with the Mexican and Japanese, particularly adapted to their problems. Coördination is secured with the sanitary department so that local conditions affecting milk, water supply, foods and various other conditions affecting child life are corrected. Much literature in various languages is distributed, and lectures are given at Women's Clubs, P. T. A., and other meetings of women.

Sick babies are not taken care of by the Health Department, but are referred to private physicians and clinics. Undoubtedly our campaign for pure, wholesome milk has helped materially to lower the infant mortality, as well as our extremely favorable climate with its abundant sunshine.

It must be understood that the Child Hygiene Conferences are purely to give educational advice on hygiene and care to the mothers and not for treatment of sick children.

Of 65 families attending a Child Hygiene Conference, 43 had never consulted a child specialist before coming to the clinic. Thirty-four had no regular family physician. Thirty-two, or about 50 per cent, claimed

they could call a doctor if the child was sick. About 55 per cent claimed they absolutely could not afford to pay a private physician for advice on well babies. Only 15 per cent claimed they could afford to take their baby to a private physician if the Baby Welfare Work was discontinued.

From these results it is quite apparent that only one-half of the families have a regular physician, and only a small percentage are able to pay for well baby advice. Most would call a doctor when the baby is sick, but certainly the economic conditions have placed most persons at a serious disadvantage at present.

The maternal mortality death rate for Los Angeles County Health Department area has shown a steady reduction over a 4-year period, from 4.9 per 1,000 live births in 1927 to 3.6 in 1930.

Covering an 8-year period, from 1923 to 1930 inclusive, infant deaths due to congenital causes have been more than cut in half—a reduction of 56.7 per cent. The significance of these figures becomes apparent when it is remembered that "prenatal care" in the form of prenatal conferences had its inception into the County Health Department plan in 1923. There are 16 conferences in all. 1,252 cases or 11 per cent of total births were registered in these conferences this last year.

The annual figures indicate that 61.8 per cent of the total county births attend Child Hygiene Conferences. This is practically the same percentage as last year (61.9). . . . A total of 87 Child Hygiene Conferences have been conducted in 60 different localities in the county. This is an increase of 7 conferences over the previous year.

Work is also carried on for the pre-school child. The Bureau of Maternal and Child Hygiene has coöperated with the County Tuberculosis Association in conducting a Summer Health School for malnourished and undernourished children. This school had an intensive course in health habits, for 6 to 8 weeks, carried on in a school building. This plan reached the parents and helped to better home conditions. For 6 weeks each summer about 500 under par children received this training. The County Tuberculosis Association deserves great credit for supplementing the work of the Health Department. Besides helping toward salaries of some of the workers,

this organization is carrying on a nutrition program in the schools, supervising school cafeterias, doing health education work in clinics and schools, and assisting in publicity.

In connection with the County Tuberculosis Association we drew up a plan 2 years ago to focus our efforts on early diagnosis, and especially to work with the child. The program of prevention calls for—

1. Supervision of all contacts, or persons who have been associated with or lived with a person who has active tuberculosis
2. Tuberculin testing of all children who are contacts, or undernourished
3. X-ray examination of the chest of all positive reacting persons
4. Physical examination of the above
5. Adequate nutritional, health education, and focusing of all types of hygiene on the infected person to keep him well

**Children's Diseases**—Every American reader of the *British Journal of Diseases of Children* would do well to read 3 articles which appear in the July-September, 1931, issue:

1. Neurosis in Childhood—by I. M. Allen, M.D.N.Z., M.R.C.P., London
2. On the Incidence of Rheumatic Fever—Francis Bach, M.A., M.D., Oxon.
3. Thrombo-Phlebitis Migrans Complicating Scarlet Fever—J. B. Ellison, M.A., M.D., D.P.H.

Two papers bear directly upon problems with which we are struggling today in the public health field. That by Dr. Allen is based upon a careful study of 169 consecutive cases of neuroses in childhood which the author presumably has investigated. The clinical and the most important psychopathic and neuropathic features of the cases are discussed. These are divided into

1. The factors which make the child less able to face his environment and difficulties.
2. The factors which appear to excite the symptoms of a neurosis in the child at various ages.

The author feels that the cases in the first group are "built up in the majority of cases around the mother-child relationships." Treatment is considered under 3 main heads:

(a) *Prophylactic*—Adequate training of the mother of a first child in the principle of child welfare is essential. Correct training of the child from his earliest days in regular habits and adaptation to influences external to himself. . . .

(b) *Symptomatic*—The child is taught to control the particular symptoms which are causing him most trouble.

(c) *Psychological*—In every case it is necessary to readjust the individual attitude and the family, social, and school environment as far as possible, so that the child may be better prepared to deal with situations which arise later.

Dr. Bach, in the beginning of his article, states:

Included in the term "the rheumatic diseases" are a variety of conditions, the majority of which are ill defined, and of which our knowledge is limited. Rheumatic fever, juvenile rheumatism, rheumatic heart disease, and chorea are clinical manifestations of a specific disease.

*Rheumatismus infectiosus specificus* is an endemic, systemic disease whose definite cause is unknown. Rheumatic fever, according to Dr. Bach, is comparable in its clinical manifestations with syphilis and tuberculosis. He briefly describes its distribution in a number of countries, including Great Britain, Canada, the New England States, Scandinavian countries, and others. The recent study by Coburn in New York is mentioned. The importance of hereditary, sociological, and geographical factors is stressed. He concludes,

It is possible that the "rheumatic state" or diathesis is dependent on certain familial and environmental factors, such as have been mentioned, and that in these susceptible persons a certain organism, possibly *Streptococcus hemolyticus*, may set up a tissue reaction, which manifests itself as the clinical picture of



"rheumatismus infectiosus specificus" or rheumatic fever.

Dr. Ellison records two instructive cases in which inflammation of the veins appears as a complication of scarlet fever. In the "migrans" type of this disease the following criterions may be applied:

1. The lesions are disseminated in time and space, small lengths of superficial veins being usually first attacked.

2. Visceral phlebitis is to be expected, commonly in the veins of the lungs or abdominal viscera, more rarely in the heart or brain.

3. Although convalescence may be prolonged and relapses are to be anticipated, the prognosis is generally favorable.

## PUBLIC HEALTH NURSING

**A Joint Program Between a City Board of Health and a Visiting Nurse Association**—In planning for a broad community public health nursing program official and private agencies should work together. It is sound for them to have a joint public health nursing service, for the important thing is for the community to be adequately served by one group of public health nurses. This plan calls for a nurse administrator whose business it is to see that the staff nurses have technical nursing ability, that there is a staff education program for them, and that they receive special as well as general supervision, to insure high standards.

Here are some advantages of joint administration of public health nursing between official and unofficial agencies:

- It prevents duplication.
- It is more economical.
- It avoids intrusion of the home by a variety of workers.
- Patients, private physicians and nurses like it.

Health education is advanced because bedside care furnishes an unusual entree into the families' confidence.

The health officer can depend upon the same nurses to interpret the rules and regulations of the board of health.

In Denver a smallpox epidemic in 1922 made the City Department of Health realize the value of a visiting nurse association and in 1924 the board started to subsidize the Visiting Nurse

Association in an expansion of its communicable disease program. In 1928 the American Public Health Association, after making an appraisal of Denver's health activities, made the following recommendations:

That the nursing service of Denver be centralized in two main divisions:

(a) School and preschool nursing service (public and private schools). Private school work to be financed by the City Health Department but all school nursing to be under the supervision of one organization.

(b) Generalized public health nursing service (Health Department and Visiting Nurse Association).

That educational and preventive work be financed by the Health Department, bedside care financed by the Visiting Nurse Association.

That the Superintendent of Nurses be responsible to the Health Officer for Health Department work and to the Visiting Nurse Association Board for visiting nurse work.

That any new proposition relating to public health nursing should be considered by a group composed of representatives of the public health nursing organizations.

As a result of these recommendations, today the Denver visiting nurses visit every home in which a communicable disease occurs. Where nursing care is given, the cost is met by the Visiting Nurse Association. All educational work done by the nurses on these cases (1 visit to each minor, 2 to each major communicable disease) is financed by the health department.

The assistant superintendent of the Visiting Nurse Association makes a daily visit to the offices of the Department of Health and brings back all cases reported. She interprets the official and unofficial organizations to each other, and acts as a special supervisor of communicable disease work. In 1930 the Denver City and County Medical Society officially approved of this joint work.

Because of its charter the Denver Board of Education could not administer the health work in the private and parochial schools, so the Department of Health pays the Visiting Nurse Association to do this work.

All these joint plans entailed a great deal of work between the Visiting Nurse Association board and the Denver city officials. The Visiting Nurse Association came to lean so heavily on the manager of health for the city that he was asked to become a member of the Board of Directors for the Visiting Nurse Association.

This joint service in Denver is really just in its infancy, but since sound ground work has been laid the organization probably "would have little to fear from change of city administration, because, in the final analysis, the political forces crave to please the voters."—Kathryn Schulken, Health Department Nursing by a Visiting Nurse Association, *Pub. Health Nurs.*, XXIII, 12: 589-592 (Dec.). 1931.

The League of Nations Has an American Public Health Nurse on its Staff—Hazel Avis Goff, R.N., has been assigned to the Health Section of the League of Nations as adviser in matters affecting her profession which have to do with League projects in many quarters of the globe.

An early task Miss Goff has before her is the preparation of a public health survey to set before the League Health Section to serve as a guide for its ac-

tivities in this connection. Her general designation is field secretary for the League of Nations.

Christine Reiman, Executive Secretary of the Internal Council of Nurses, composed of the national nurse associations of 23 affiliated countries and the associate national representatives of 9 other countries, has her headquarters in Geneva. Until this time the Health Section of the League has consulted her freely about various phases of health education and schools of nursing. This has taken up a great deal of her time, and there is a growing need for field work. Miss Goff, who is a nurse well experienced in all phases of nursing, has been employed through the generosity of a philanthropic anonymous nurse in the United States.

The director of the American Red Cross Nursing Service chose Miss Goff from the long list of those who had seen foreign service under the Red Cross. She is a graduate of the Massachusetts General Hospital School of Nursing, Boston, and had had experience in several nursing schools in the United States when she was selected by the American Red Cross to direct the school of nursing the Red Cross was sponsoring in Sophia, Bulgaria. Here she was successful in founding a school which after a few years could be carried on under the direction of its graduates. After this she was field director on the nursing staff of the European office of the Rockefeller Foundation. She has recently received her B.S. degree in Public Health Nursing Administration from Teachers' College, Columbia University, New York.

Miss Goff will work directly under the Medical Director of the Health Section of the League and will be on an equal footing with her medical associates working under the director.

#### REFERENCES

- American Nurse Advisor to the League of Nations.  
*Red Cross Courier*, XI, 5: 522 (Nov.), 1931.  
International Nursing News, *Brit. J. Nurs.*, 79, 1960: 306 (Nov.), 1931.

**Do Nurses Know Mental Hygiene?**—Curiosity, keen powers of observation, and critical evaluation are three qualities vitally important in the work of the public health nurse. Yet her nursing school training seldom develops these because the routine rules of the hospital are apt to stultify her ability to plan and manage and make her dependent upon a set standard that does not require thinking. When she gets out into a public health district she is bewildered when she finds that each family and even each individual has different hygiene requirements. For one public health nurse who is wise in dealing with a family situation because she understands the underlying emotional implications, there are probably ten who "scold or dictate or mildly threaten, or apply some set formula, or agree with the patient because it is the easiest road to take, or give up the family in despair with the complaint that they are uncoöperative."

After being trained to take orders in the hospital, the freedom she finds in public health nursing makes the nurse's sense of importance go to her head. She uses on the patient the methods that have been used on her and orders him to do this and that "with a considerable air of omniscience and authority, without stooping to explain." In the hospital when the patient is in bed and unable to rebel this method may seem to work, but not in the home where the patient does not have to obey. Here, whatever is done has to have the approval of the family "from the dog up." "The visiting nurse who has not learned the technic of making friends with the watch-dog never even gets inside the door of many of her homes."

In the public health field the nurse has to learn that maladjusted personalities and emotional strains are often as potent in causing illness as typhoid, pneumonia, cardiac disease, arthritis, etc. A well known cardiac specialist

has said that 50 per cent of the problems in cardiacs is emotional, a great stomach specialist says that 50 per cent of the problems in gastroenteritis is emotional, and a specialist in internal medicine says that 40 per cent of the problems in medical patients is psychological, instead of physical.

There are many nurses in executive and supervisory positions who know the latest scientific methods of doing public health nursing "but they haven't learned the art of working with other people." They are now dealing with physicians, social workers, teachers, etc., whose coöperation they have to win by the "most delicate arts of understanding sympathy and persuasion," not by the authority of rank. Professional relationships get in a hopeless jam and they leave one position for another. Many of their difficulties are due to psychic injuries in childhood, but it may be that their hospital experience has put the final touch to their maladjustment.

A good psychiatric worker should be made a member of the faculty of every school of nursing. Her work could be divided between two fields, the faculty of the school and its students.

She could assist the faculty in the following ways:

- Help them to understand themselves and the student nurses as individuals.

- Help them learn how to lead. Most people learn to lead through training as much as through intuition.

- Help them to learn how to teach so as to awaken curiosity, stimulate thought and develop analysis and judgment.

- Help them to study the habits and attitudes which tend to cripple, and discover ways of compensating for them.

She could help student nurses in the following ways:

- Teach them to understand human nature, using the hospital for this purpose.

- Teach the relation of the mind to the body; of the emotions on the functioning of the body.

Increase their insight through individual consultations.

It may be that the majority of student nurses would profit more by a study of the more or less normal problems of personality than by the study of outright mental disease, though, of course, the nurses who wish to spe-

cialize in psychiatric nursing would need experience in the psychiatric hospital and lectures in psychiatric nursing. Perhaps nursing schools would do better to teach the majority of student nurses mental hygiene rather than psychiatry. —Elizabeth Fox, *The Nurse and Psychiatric Work*, *Mid-Monthly Surv.*, Dec., 1931, pp. 307-308.

## EDUCATION AND PUBLICITY\*

**Checking the Radio Audience—** Desiring to know to what extent, if any, the health department radio program is worth while, a survey was made in May, 1931, to ascertain if possible how many listeners existed. This survey was conducted by instructing health department nurses, in making regular calls in homes in their districts for any purpose whatsoever, to put a question as to whether the family living there was listening with more or less regularity to the health department program. These homes were taken just as they came in the course of health department business with no selection whatsoever; hence they were scattered over the whole city and represented all types of people.

This survey was repeated in the first week of November, 1931, in order to ascertain what changes, if any, had occurred in the status of the radio program. It will be seen that the apparent drop between May and November is to be explained by items two and three of the tabulations. In each survey about the same number of homes were visited. In May 76.4 per cent were found to have radios while in November radios were found in only 58.7 per cent of the homes, and many homes were found

without radio because of inability to buy batteries or tubes for old radio sets.

Since this survey represents only 6.9 per cent of the homes in Racine, it would seem reasonable to conclude that, even with liberal deduction for possible error, these listener ratios represent a worthwhile radio audience for our health message, and what is still more important, an audience that is growing.

	May	November
1. Number of homes at which nurses called	564	548
2. Homes without radio	133	226
3. Homes with radio	431	322
4. Homes in habit of listening to H. D. program	186	159
5. Homes not in habit of listening to H. D. program	245	163
6. Per cent of total homes listening	33.0	29.0
7. Per cent of total homes not listening	67.0	71.0
8. Per cent of homes with radio, listening	43.2	49.4
9. Per cent of homes with radio, not listening	56.8	50.6

The following preferences were expressed between various of our series of episodes:

Vacation series	26
Public health nursing	30
Scarlet fever and quarantine	26
Sanitation	15
Diphtheria prevention	32
Pre-school	20
Tuberculosis	12

—W. W. Bauer, M.D., Racine, Wis.

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Pearl G. Routhahn, 120 East 22d St., New York, N. Y.

**Tuberculosis Doesn't "Just Happen"**—This title of a small folder is the keynote of the April, 1932, Early Diagnosis Campaign sponsored by tuberculosis associations. The carefully laid plans have included a variety of helps: printed matter, posters, lantern slides, motion pictures, electrotypes, and material to be adapted for state and local use.

Back of the popular material is a group of pamphlets for professional readers: health officer, social worker, public health nurse, and physician.

State associations will be the sources of supplies for the campaign. A list of what is being made available will be sent by the National Tuberculosis Association, 450 7th Ave., New York.

**Publicity by Physicians**—"Guided by the belief that the members of the medical profession," says the Medical Society of the County of New York and the New York Academy of Medicine, "and particularly members of these two organizations, are prompted by the desire to act in accordance with medical traditions and that code of ethics which, in its last analysis, has been laid down for the benefit of the public rather than the profession," the two bodies have issued *Principles Governing Contact of Physicians with the Public Through the Press, Lecture Platform, Lay Periodicals and Radio*, an 8-page pamphlet.

In considering the common avenues through which the profession and individual physicians may address the public, namely the press, the radio, the public platform and popular publications, we find three possible types of approach. These are publicity, propaganda, and public health education.

*Publicity* we witness in the medical world under two aspects. In one it gives due public notice of events which constitute legitimate news, such for example as the election of new officers in a medical organization; the opening of a new hospital; the award of a prize for distinction in medicine and the like. . . .

*Propaganda* has for its main objectives the arousing of public interest in supporting and

acting on health matters. In propaganda, emphasis is placed on some matter of public health interest and only incidentally upon the physicians connected with it. . . .

*Public Health Education* differs from publicity and propaganda by the nature of its content. A statement, for example, that measles is a much neglected and dangerous disease made by Dr. Jones may serve as a typical example of a public health education message. Such a statement should not give special prominence to its maker. . . .

### In broadcasting

The speaker's name may be given by the announcer without adorning and superlative references to his abilities or achievements. Dr. John Jones, Clinical Professor of Medicine at the X. Y. Z. University, will suffice as an introduction. Dr. John Jones, who is a practicing physician, should not be introduced as an internationally famous authority, etc. . . .

Health workers may well write for a copy to Medical Information Bureau, 2 East 103d St., New York. Use it as a guide in handling publicity when physicians serve the department or association.

**What Departments Told the Public**—Below are topics of recent press releases by state health departments. Do other departments issue mimeographed or printed releases to the newspapers?

Connecticut: "A Daily Food Plan Needed" (choice of food).

Detroit: "Prevalence of Certain Communicable Diseases"; "Trend of Infantile Death Rate in Detroit."

Iowa: "Ring-Worm"; "Lifeless Body" (carbon monoxide); "Needless Waste of Human Life" (homicides, accidents); "Christmas Seals."

Maryland: "Don't Broadcast Your Germs"; "Partnerships" (buyers of Christmas seals); "Take Care When You Skin or Handle the Meat of Wild Rabbits"; "Bad News and Good News" (diphtheria).

New York State: "How Can You Prove You Were Born?" (radio);

"Rickets" (radio); "What Is a Public Health Nurse?" (radio).

Oregon: "Pneumonia a Dangerous Contagious Disease"; "The Modern Health Officer"; "Child Hygiene."

U. S. Public Health Service: "Pelagra Preventive Value of Certain Canned Vegetables"; "Age and Sex Incidence of Influenza and Pneumonia"; "The Endocrines, Glands of Personality" (radio); "The Common Cold"; "Disease Reporting and Disease Prevention" (radio); "The Health of the School Child."

**Team-work in Public Health Education**—The development of "The Functions and Limitations of Government in Public Health Education" are traced by Dr. Allan J. McLaughlin up to and through the period when

Health officers gave up the idea that all public health work could be done by personnel on the payroll of the health department. It was obvious that the education of individuals in personal hygiene and the securing of their voluntary help in preventing disease involved the participation of many agencies, official and unofficial, outside the health department.

With the growth of unofficial voluntary agencies

The responsibility for the health of the people was still squarely placed upon the shoulders of the health officer, yet a large part of the work necessary to discharge his obligation had to be done by personnel not under his direct control.

Dr. McLaughlin raised the question: "What is public health education?"

When a health administrator essays to answer this question he is appalled by its magnitude. There are many narrow definitions which may be given by health workers in their own special field. There are drives for specific purposes which are public health education in its best sense; but public health education as a whole is so complex and consists of so many independent efforts that its scope and potentialities are tremendous.

Following a discussion of the partici-

pation of federal, state and local agencies, the schools and colleges, Dr. McLaughlin concludes:

The important thing for administrators to remember is that it matters little by whom the work is done, provided it is well done. Public health education has grown up in a haphazard manner, fostered by a score of agencies, official and unofficial. The time has arrived when the man charged with the responsibility for the health of all the people of a state—the State health officer—should take stock of what has been done and is being done by these diverse agencies. He should formulate with their help a comprehensive program to include all existing public health education activities and to expand the work or create new work so that the field may be as completely covered as possible.

All concerned with health education in or out of schools will wish to read the whole of this paper.—*Public Health Reports*, U. S. Public Health Service, Washington, Sept. 25, 1931. *Free*.

#### TIMELY TOPICS

"Why a Community Needs a Health Department," by John P. Koehler, M.D.—*Bulletin*, Milwaukee Health Dept., Nov., 1931.

"The New '18 Week Diet'"—*Everybody's Health* (Nov., 1931), St. Paul. "Adequate diet of meat and cereals and fruits and green vegetables and a quart of milk a day." *Sample free*.

A reminder of the wealth of material for press and house organ use which appears in the monthly issues of *Statistical Bulletin*, Metropolitan Life Ins. Co., New York. *Free*.

#### EXHIBITS

Making an exhibit eminently practical is described in *Quarterly Bulletin*, Frontier Nursing Service, Lexington, Ky., Autumn, 1931:

One of the nurses at the Red Bird Center had a most interesting health booth, the first of its kind to be held in that county. It stood out from the other exhibits by virtue

of its clean white walls, the nurse in her white uniform, and the bright colored health posters. Inside was an almost life-size sanitary dirt toilet as approved by the Kentucky State Board of Health, a model fly- and snake-proof baby-bed, and a model milk safe. Over each one was a printed notice giving the exact cost of lumber, nails, labor, etc., involved in the construction. There was also a baby scales with a sign, "Let us weigh your baby," which attracted many people, and a model layette on display. Chairs were provided outside for those who wished to rest, thus affording the nurse ample opportunity for giving advice and health instruction in addition to the printed literature which was, of course, on hand for those who read. . . . It might almost be said that the hero of the occasion was the sanitary toilet which caused intense interest and was the subject of an article in the *Manchester Guardian*, the local newspaper, the following day.

"State Fair Better Babies Demonstrations," by A. E. Schweitzer, M.D. *Bulletin*, Indiana State Board of Health. Oct., 1931. Describes what the State Board has been doing since 1920.

"Suggestions for a Food Exhibit," by D. Stackhouse. *Practical Home Economics*, New York. Dec., 1931. For a high school class.

An account of the 1931 Berlin housing exhibit says: "The German flair for arranging educational exhibits was shown at its best." Analyzed, is not that "flair" made up largely of belief in popular education, appreciation of the effectiveness of graphic displays, and a great willingness to invest thought, money and technical skill in their preparation?

#### HONORABLE MENTION

To American National Red Cross: For detailed table of contents in annual report.

To Division of Infant and Child Hygiene, Indiana State Board of Health: For table of contents (called "Index") in annual report.

To Quebec Provincial Bureau of Health: For annual report with table of contents and table des matières.

To Superintendent of Health, Provi-

dence: For annual report with table of contents.

#### FOR TEACHER—FOR PUBLIC

Mental Hygiene in the Class Room (44 pp.); Behavior Problems of School Children (20 pp.). National Committee for Mental Hygiene, 450 7th Ave., New York. 15 cents each. "That the teacher may realize that school is not simply a question of pushing children through the grades, but that it has all the diversity and importance of life itself, and that in helping children adjust to school she is helping them adjust to life."

From John Hancock Life Insurance Co., Boston (free):

Your Friend the Health Officer. 12 pp. For the public. Good copy for health officer to use. Good for private health workers to read.

Healthy Teeth. 12 pp. The minimum of what should be known.

#### CONTESTS

A contest for the best narrative report by a public health nurse is being conducted by *The Gleaner*, Bureau of Child Hygiene, Texas State Dept. of Health.

The Snappy Snapshot contest of *Public Health Nursing* (Nov. 11, 1931) resulted in two awards being given to "Weighing (Negro) Rural School Children" from Alabama, and "Houseboat Nursing" from West Virginia. The awards were based on "originality, interest and photoplay."

The Junior Red Cross seeks a new poster to be used in many countries. For details of the contest address Junior Red Cross, Washington, D. C., or national headquarters in your own country.

#### REPORTING

"Dumps," "Swine," "Garbage," and "Nuisances" are noted in the contents of an annual report. "Public Health Education" is not listed.

Two features of interpretation are found in the annual report of the American National Red Cross. Under the chief headings are from 2 to 6 lines, in italics, giving a brief outline of the scope of the service reported under that title. For example, under Home Hygiene and Care of the Sick:

Practical instruction in personal health and home hygiene, prevention of disease, infant and child care, simple procedures in home care of the sick and in emergencies, and community health.

In the financial statement of the Red Cross are explanatory phrases which make the items more clear and less formal than is frequently the case.

Quebec Provincial Bureau of Health, Montreal, has a few extra sets of its reports from 1922 which it will supply upon request.

"The Year in Review," in *Public Health News* (Sept.-Oct., 1931), New Jersey Dept. of Health, gives a readable account in 9 pages of the highlights of

the year. Frequent headings break the text and guide the reader.

Seven bright rose colored mimeographed sheets make up the annual report of Buffalo Tuberculosis Association, 708 Ellicott St. Plenty of center and side headings, with indentations, keep away any sense of heaviness. In making up the sheets a page of dispensary figures slipped in as the second page where it may discourage some readers from going further. A 3-page, yellow paper supplement reports on the medical work of the association. A photogravure page from *Buffalo Courier-Express* provides the picture element for this reporting project.

A mimeographed report can be accompanied by a page of pictures at low expense. Mounted on a sheet the size of the report copies can be reproduced by planagraph or similar process for about \$5.00 for 1,000 copies of letter-size sheet. The editor will supply addresses.

#### NATIONAL CHILDREN'S BUREAU ACTIVITIES OF ITALY

THE National Children's Bureau of Italy, an official body maintained mostly by public funds, spent, in the years 1927 to 1930 inclusive, more than 315,000,000 lire (\$16,569,000) on maternal and child welfare work. Of this sum 24,000,000 lire was used for teaching hygiene to the rural population. Nearly 400,000 expectant mothers and children were examined at the bureau's clinics; 1,800,000 children and 88,000 expectant mothers were examined and treated at its 59 traveling health centers, which so far have confined their activities to the rural districts of southern and central Italy. More than 165,000 children have been maintained by the bureau in sanitariums and other institutions for sick or defective children.

In addition to maintaining its own in-

stitutions, the bureau also subsidizes other institutions, public and private, and exercises supervision over them. Free lunch rooms for mothers and children and free maternity homes are also maintained. Financial aid to parents and to unmarried mothers is provided. Altogether the bureau extended aid to more than 766,000 persons, exclusive of the mothers and children examined at the traveling health centers.

During the years 1927 to 1930 more than 3,000 inspections were made of 2,800 institutions, resulting in general hygiene improvements. Under the auspices of the bureau a study was recently made of the diets in the various children's institutions, and standard dietaries were introduced into the institutions financially aided by the bureau. —*Maternità ed Infanzia*, Rome, Sept., 1931, p. 881.



## BOOKS AND REPORTS

**The History of Medicine**—By *Bernard Dawson, M.D.* London: *H. K. Lewis & Co., Ltd.*, 1931. 160 pp. Price, \$2.50.

This book is made up of lectures delivered to junior medical students of Adelaide University. In the brief space of some 160 pages, it gives a concise and accurate history of medicine from the earliest days down to the time of Lister and Pasteur. It is written in an interesting fashion and will undoubtedly fulfil its object of stimulating students to further studies along historical lines. We could wish that more space had been given to modern medicine, though we believe it wise to limit personal histories, at least, to those who have passed away.

There are a few errors of fact, but none of any great consequence have come to our attention. Altogether, we believe it to be the best book of its type which we have seen.

MAZÛCK P. RAVENEL

**Science in Action**—By *Edward R. Weidlein and William A. Hamor.* New York: *McGraw-Hill*, 1931. 310 pp. Price, \$3.00.

With a sub-title of "A Sketch of the Value of Scientific Research in American Industries," the publishers present an interesting and readable book telling the story of the growth of industrial research in the United States. The authors hail from the Mellon Institute of Industrial Research, Pittsburgh, Pa., and for 15 years have been popularizing science through lectures and articles.

The book attempts to explain scientific management of industries, including correct business administration and sound science in opposition to empiri-

cism, and to unfold something of the real magnitude of these present-day undertakings and their immense economic value. The discussion is divided into an historical or "groundwork" introduction, followed by 6 major parts, or divisions, respecting research itself, human welfare, technology, management and rationalization, methods and men.

The sources basic to industrial research are considered to be mathematics, physics, chemistry, geology, biology, psychology, economics and engineering. The spirit of such research is sincerely scientific and open-minded with the constant aim of discovering the truth and its application to human need. The latter is broadly discussed, including the relation to medicine, especially pharmacology, to labor, and to various international questions, with citation of the names of many corporations and individuals—so that a name index is provided in addition to a thoroughly complete subject index. In this connection those who are more particularly interested in the personnel of given research staffs and the exact research work carried on by each should consult, further, *Bulletin No. 81* of the National Research Council, by C. J. West and C. Hull—*Industrial Research Laboratories in the United States*, 4th ed., 1931.

An engaging philosophy of purpose and enthusiasm to urge on the accomplishments which must come to pass, pervades the present work. All interested in research in any way will enjoy it thoroughly, as it is fruitful of ideas and encouragement. Among other things stress is placed upon the excellence of equipment necessary to discover the many things now coming to

light which would have been impossible because of this lack in so recent a period even as that of Pasteur and Ehrlich. Today, research is needed to determine the medical possibilities alone of some 260,000 organic compounds.

Some statements occur which, of course, not all will agree with, such as "fatal issues now seldom occur" (in diabetes as the result of the discovery of insulin, p. 88), and the understatement that the vitamin "needs of the body are supplied largely by milk, butter, green vegetables and fruits" (p. 89).

Illustrations and a few tables accompany, while the general set-up of the work is all that good printing and publishing imply. EMERY R. HAYHURST

**Personal Hygiene Applied**—By Jesse Peirce Williams, M.D. (4th ed.) Philadelphia: Saunders, 1931. 520 pp. Price, \$2.25.

Since its appearance in 1922, this work has undergone numerous reprintings, and has now reached its fourth edition. This is evidence enough to show it has met with favor and has filled a need felt by teachers. While the present edition has been brought up to date, the chief new feature is the introduction of "Questions and Exercises" at the end of each chapter.

The book can be commended as one of the very best of its type.

MAZÛCK P. RAVENEL

**Common Pests. How to Control Some of the Pests That Affect Man's Health, Happiness and Welfare**—By Rennie W. Doane. Springfield: Thomas, 1931. 398 pp. Price, \$4.00.

This book, so written that it is understandable to the public as well as to physicians and health officers, is an account of common pests. It does not pretend to give anything original, but is a discussion in a single volume of the

more important groups of pests which directly or indirectly affect man and animal injuriously. Only the more common species of each group are treated. The discussions are brief, but clear, accurate, and sufficient for the general reader.

The illustrations are exceptionally good, well chosen, and many of them original. The reading of this book should do much to dispel the common dread in which spiders, scorpions, etc., are held by the public. We wish for it a wide circulation.

MAZÛCK P. RAVENEL

**A Text-Book of Oral Pathology—For Students and Practitioners of Dentistry**—By Russell W. Bunting, D.D.S. Philadelphia: Lea & Febiger, 1931. 495 pp. Price, \$7.00.

While there is not a chapter in this excellent book that is not of interest and does not contain material of value, two especially will appeal to the public health worker and are suitable for review in a journal on public health—those on dental caries and pyorrhea alveolaris. These are two vexed questions. Even the youngest of us can remember when the endameba buccalis was thought to be the cause of pyorrhea and emetin was given wholesale as an amebicide, until it was shown that the organism certainly had nothing to do with the disease and was found in the mouths of healthy people.

It may be said that in spite of the enormous amount of work which has been done upon it, it is still a puzzle. Two theories held have been that (1) it was constitutional, (2) that it was local. The author points out that the lesions are almost invariably accompanied by a local inflammatory process and that treatment of these as well as occlusal stresses often entirely relieve the condition and cures it. He inclines to the idea that both factors are involved and that the disease is the product of

both local and systemic disturbances. While discussing the various bacteriological findings, he apparently does not accord a great deal of importance to them as causative factors. He points out that caries and pyorrhea do not flourish in the same mouth, holding that the former is due to acid forming organisms present in the oral flora, while in the other, proteolytic types of microorganisms find a habitat in the soft tissue about the teeth, producing their characteristic effects. He leans strongly to the idea that caries is due to the acidophilus and has produced the disease, apparently typical, both in the test tube and in the living being. In more than 2,000 cases he has found the acidophilus practically always, while it was absent from healthy mouths. Consequently, he regards caries as an infective disease. He recognizes the difficulty of explaining why these aciduric processes prevail in one mouth and not another.

He also recognizes the necessity of good food during the formative period, but does not go so far as many of those who are enthusiastic over the effect of the diet.

The book is abundantly and excellently illustrated. Certain chapters have been written by specialists, though the bulk of the book is due to the author. Altogether, it is one of the most thoughtful, exact and informative books on the subject which it has been our fortune to read. The printing and make-up are excellent though unfortunately it is on very heavy paper.

MAZŮCK P. RAVENEL

#### Nineteenth Annual Report of the International Association of Dairy and Milk Inspectors.

This, the 19th Annual Report of the association, includes the constitution, by-laws, program of the 19th Annual Convention, reports of committees, and papers read at the convention which

was held in Cleveland, O., October 22-24, 1930.

The many important and interesting papers read included "Those on bacteriological and laboratory studies and procedure plant studies, including time and temperature, inspection of plants, cleaning and sterilization of equipment, flavors in milk, milk control from farm to table, coöperation problems between inspectors and plants and opportunities in the dairy industry. Other papers included a survey of New York State milk and cream supply, one on undulant fever, and a report on such activities of the International Association of Milk Dealers as would be of interest to this association. Every paper had something to offer to the milk industry in general and the report is of particular interest to every dairy and milk inspector as well as public health official.

V. B. L.

*Annals of the Pickett-Thomson Research Laboratory. Volume VII. The Pathogenic Streptococci. The Rôle of Streptococci in Erysipelas, Skin Diseases and Measles—Baltimore: Williams & Wilkins, 1931. Price, \$10.00.*

The style of the three monographs in this volume is essentially the same as that of the preceding five on the streptococci. The aim is to present a complete survey of researches recorded in the literature, to which the authors have added their own findings as to the value of Crowe's medium in the differentiation of various species of streptococci, together with an extensive series of microphotographs. Since variation in the moisture content, etc., of Crowe's medium causes variation in colony form, the difficulty with this method is apparent.

The monographs are devoted to the rôle of streptococci in erysipelas, skin diseases and measles. *S. erysipelatis* is recognizable as a distinct species of he-

molytic streptococcus by means of an iodine test of colonies grown on Crowe's medium, sugar fermentation tests, serological and bacteriophage tests. It is thus the specific infectious agent in erysipelas. The confusion between *S. pyogenes* and *S. erysipelatis* as the causative agent may arise because of its ubiquity, the fact of a secondary infection in the disease, as well as the possibility that there are varieties of streptococci which lie intermediate between the two.

The survey of the researches on the etiology of skin diseases reveals that in many cases the problems remain unsolved. This is probably due, at least in part, to the difficulty in cultural methods. The chapter on selective methods of cultivating streptococci from the skin should assist in further researches in this field.

The authors summarize the results of researches on the etiology of measles as follows: "It would appear that the cause of measles has not yet been discovered, and it seems likely that the disease is caused by an invisible non-cultivable filter-passing virus" (p. 384). They, however, state that further researches are necessary before the organism of Caronia, a specific streptococcus, and the pleomorphic organism described by themselves can be disregarded. Their own researches are presented and furnish material for interesting speculation.

To each monograph is appended the bibliography and photographs of organisms and colonies.

This volume is another valuable asset to all persons interested particularly in the research aspects of the streptococci. Excellent organization of material renders the use of the volume easy. The index of each monograph is complete. The volume abounds both in facts and problems still unsolved in all phases—bacteriological, immunological, epidemiological, etc.—of the diseases discussed.

ESTHER W. STEARN

*Confessio Medici*—By Stephen Paget, F.R.C.S. New York: Macmillan, 1931. Price, \$2.00.

This delightful series of essays needs neither criticism nor commendation. It has been before the profession and public for nearly a generation, and is familiar to all sincere readers. To the older members of the profession, it needs no introduction, but we wish to commend it especially to those who have entered the profession in the last few years or who will enter it in the future.

The publishers have put it out in excellent style on mat paper and in clear type. There is no one who cannot get enjoyment and profit by reading these essays.

MAZÏCK P. RAVENEL

*The Lungs: and the Early Stages of Tuberculosis*—By Lawrason Brown, M.D., and Fred H. Heise, M.D. New York: Appleton, 1931. 140 pp. Price, \$1.50.

The volume is the latest addition to the Appleton Popular Health Books. It is comprehensive and compact, presenting in 140 pages much valuable information regarding the latest conception of the cause, prevalence, detection, prevention and treatment of tuberculosis.

The first chapter describes the anatomy and physiology of the lungs. The style is in some parts a trifle labored, due no doubt to the authors' desire to make certain necessarily technical information comprehensible to the lay reader. The book should number, among its most interested readers, nurses, students and tuberculosis patients. All lay readers will find it a valuable contribution to a subject of vital importance in this day of preventive medicine. The book contains a very good index. The prominent tuberculosis specialists who collaborated on the work need no introduction.

L. O'LEARY

**The Family in the Present Social Order**—By *Ruth Lindquist*. *Written and published with the coöperation of the American Home Economics Association*. Chapel Hill: University of North Carolina Press, 1931. 241 pp. Price, \$2.50.

The factual data from which the observations and conclusions found in this book were made, were obtained through the questionnaire method. Information was obtained from the alumnae of two professional fraternities with the assistance of some of their close friends. An effort was made to secure, as far as possible, information of the more pertinent conditions that directly or indirectly affect the health and happiness of the home. This approach to an understanding of the problems presented by the family has considerable merit, for it discloses, to a very suggestive if not convincing degree, effects, not only of the material aspects such as income, living conditions, neighborhood and the like, but also of the spiritual or mental factors such as different philosophies of life, the effects of different social backgrounds, temperament, religious practice, and the like. The author has been very careful in her interpretations so that her conclusions are never extravagant.

There is an appreciation that the material collected is not entirely complete or far-reaching enough to explain all the conditions that tend to mould the life of the individual family. As the questionnaires were sent only to women the problems that the husband and father contributes to and those which he is also called upon to solve are necessarily not included. The problems more characteristic of the family belonging to a lower economic strata are naturally not brought to light, as a large per cent of those coöperating in this study had more than a high school education. Only 1.2 per cent had an income of less than \$1,800 per year.

This study is in line with the general trend of thought today, that education, if its purpose is to prepare individuals for life, must include, in addition to the giving of facts, an understanding of oneself and of others, with some technic of making the necessary social and personal adjustments. There is abundant proof in the study that preparation for marriage is evidently a necessity.

This little volume has considerable merit and can be read with a great deal of profit by those contemplating marriage and wishing to have some knowledge and insight into the sphere of life they are contemplating entering; it also can be helpful to the professional worker who in any way comes in contact with family life and who is in a position to advise or otherwise help.

The book, itself, is very well written so that the reader finds himself taken along page after page due to the importance and challenge of the material and also because of the excellent way in which it is presented. There are two appendices. Appendix I is a statistical presentation of the three special groups in the study on the basis of the types of education and training the women possessed. Appendix II contains questionnaires. There is a selected bibliography that is very valuable.

FRANK J. O'BRIEN

**School Nursing: A Contribution to Health Education**—By *Mary Ella Chayer, R.N., B.S.* Introduction by *Katharine Tucker, R.N.* New York: Putnam, 1931. 292 pp. Price, \$2.50.

At last we have a book which orients the public health nurse in relation to health education. Miss Chayer's combined training and experience qualify her to deal with this controversial subject. She writes from the standpoint of an educator as well as a public health nurse. The book is, therefore, specific as well as comprehensive; practical as well as philosophical. It has been ap-

parent for some time that the school nurse makes a distinct contribution to health education, and the author of this excellent volume tells us just why, when, and how.

Two types of school nursing seem to be emerging—the health service type, which deals largely with the control of contagion and the correction of defects; and the health education type, which aims at the fullest development of the personality through supervision of the emotional and social aspects of health as well as of the physical. In the latter type, health service is solely a means to the end of health education.

The entire chapter on Principles of Education as Applied to the School Nurse is particularly timely. The individual needs of the school child are given due consideration, and the means of reaching the child through parental education and home nursing are discussed. Another chapter, which should prove helpful to school nurses, is on Relationships.

It is very encouraging to note the emphasis placed upon the proper training of the nurse for health education. The author contends that only nurses with adequate training in both the educational and public health fields should attempt to qualify as health educators or health coördinators.

The book is well printed, illustrated, and indexed, and contains a good working bibliography of books, pamphlets, and magazine articles.

RICHARD A. BOLT

**Preparation of Scientific and Technical Papers—By Sam F. Trelease and Emma Serepta Yule. Baltimore: Williams & Wilkins, 1930. 113 pp. Price. \$1.50.**

This is a reprint of the second edition. The pronounced success of the book has proved its value, and there is little to criticize.

We cannot quite understand the incompleteness of the lists of journals with abbreviations. Too many have

been given to serve simply as examples, and not enough to cover the ground. For example, under Medicine, neither the *British Medical Journal* nor the *Lancet* is mentioned. Under Hygiene, the *American Journal of Public Health*, which we believe to be the oldest in existence, is not found. Many other omissions of journals which should be useful to scientific writers are noticed.

If it were not for the serious nature of the entire book, we would suspect the authors of a sly dig at scientific writers. On page 27, the specimen heading for a thesis given is "Cultivation of Coconuts," which might not be a bad name for this work. The printing and make-up are excellent, and it is a distinct addition to the armamentarium of both writers and editors.

MAZÏCK P. RAVENEL

**Nutrition and Physical Fitness—By L. Jean Bogert, Ph.D. Philadelphia: Saunders, 1931. 540 pp. Price, \$3.00.**

This small book, discussing the nutritional needs of the body, chemistry of nutrition, planning of meals, and diets for special conditions, gives a large amount of useful information. A commendable portion of the chapter on fruits and vegetables describes the value of base forming foods; and that on the vitamins and mineral salts is well illustrated from articles by authorities on nutritional deficiencies. An outstanding feature is the discussion of meal planning, food economics, the effects of cooking, and fads and fallacies about food. The significance and treatment of overweight are given commendable attention, but very little is written about other phases of physical unfitness. An appendix contains some useful tables. The text is clear, concise, and well illustrated. The book should be of special interest to the laity, dietitians, nurses, and medical students.

FRANCIS L. BURNETT

**Nucleic Acids**—By *P. A. Levene and Lawrence W. Bass*. New York: *Chemical Catalog Co.*, 1931. 337 pp. Price, \$4.50.

The interest that biologists have in the nucleic acids is obvious. Few of them, however, have the necessary training to make laboratory studies of these fundamental substances. On the biochemist and the organic chemist (if such a distinction is allowable) must fall the labor of investigation. The authors have given an unusually readable and logical account of the chemistry of these extremely complex organic compounds characterized as esters of phosphoric acid with an organic radicle "consisting of a sugar and a nitrogenous component which is a cyclic derivative of urea."

After a discussion of the sugars the

reader is introduced to the imidines and imido esters, to the pyrimidines, the purine bases, the nucleosides, the nucleotides, and finally to the nucleic acids.

Even if the biologist has forgotten most of the complicated organic formulas which he might have known at one time, the book is well worth reading because of the impression that is left, although the formulas may rapidly disappear from the conscious mind.

The bibliographic references are extremely numerous so that those desiring to go further into the subjects discussed will have no difficulty in locating original material. Brief mention is made of the studies on nucleic acids of the tubercle bacillus. The authors have made a notable contribution.

JOHN F. NORTON

## BOOKS RECEIVED

**CONFESSIO MEDICI**. By Stephen Paget. New York: Macmillan, 1931. 158 pp. Price, \$2.00.

**THE DOCTOR EXPLAINS**. By Ralph H. Major. New York: Knopf, 1931. 277 pp. Price, \$3.50.

**EXAMINATION OF WATER**. 6th ed. By William P. Mason and Arthur M. Buswell. New York: Wiley, 1931. 224 pp. Price, \$3.00.

**INDUSTRIAL HYGIENE FOR ENGINEERS AND MANAGERS**. By Carey P. McCord. New York: Harper, 1931. 336 pp. Price, \$5.00.

**MEDICINE IN VIRGINIA IN THE EIGHTEENTH CENTURY**. By Wyndham B. Blanton. Richmond: Garrett & Massie, 1931. 449 pp. Price, \$7.50.

**OFFICIAL AND TENTATIVE METHODS OF ANALYSIS OF THE ASSOCIATION OF OFFICIAL AGRICULTURAL CHEMISTS**. Compiled by Committee on Editing Methods of Analysis. Washington: Association of Official Agricultural Chemists, 1931. 593 pp. Price, \$5.00.

**DIABETES: ITS CONTROL BY THE INDIVIDUAL AND THE STATE**. By Elliott P. Joslin. Cambridge: Harvard University Press, 1931. 70 pp. Price, \$1.00.

**PROCEEDINGS OF THE NATIONAL CONFERENCE OF SOCIAL WORK**. Chicago: University of Chicago Press, 1931. 702 pp. Price, \$3.00.

**THE VITAMINS**. By Ethel Browning. Baltimore: Williams & Wilkins, 1931. 575 pp. Price, \$10.00.

**RURAL SCHOOL NURSING. AN OUTLINE FOR RED CROSS PUBLIC HEALTH NURSES**. American National Red Cross, 1931. 151 pp. Price, \$0.50.

**MANCHURIAN PLAGUE PREVENTION**. Service Reports, 1929-1930. Vol. VII of the Series. Harbin Anti-Plague Institute, 1931. 232 pp.

**MRS. DOSE, THE DOCTOR'S WIFE**. By Joyce Dennys. New York: Appleton, 1931. 154 pp. Price, \$1.50.

**WHY WE DO IT**. By Arthur R. Daviau. Boston: Meador Pub. Co., 1932. 231 pp. Price, \$2.00.

**LIFE OF SIR CLIFFORD ALLBUTT**. By Sir Humphry Davy Rolleston. New York: Macmillan, 1929. 314 pp. Price, \$6.00.

**COURTS AND DOCTORS**. By Lloyd Paul Stryker. New York: Macmillan, 1932. 236 pp. Price, \$2.00.

**A GRAPHIC STORY OF MILK**. The Douthitt Corp., Chicago, Ill. 24 pp. of charts.

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**New York's Dipped Milk**—The findings of a commission of distinguished members answered certain questions of the health commissioner as follows: Loose milk is a potential health hazard which can be removed only by the prohibition of its sale (except under certain restrictions); but owing to economic conditions, it is recommended that the prohibition become effective in 1933. The full report will be published shortly and will be available.

ANON. Banning of Dipped Milk Recommended. *Weekly Bull. (N. Y. C. Dept. of Health)*, 20, 46: 341 (Nov. 21), 1931.

**Prenatal Hygiene Principles**—This British lecture on the remedies for the causes of maternal mortality indicates that there is little difference of opinion on the subject here and abroad. The exception is the British tendency for frank discussion of the importance of eugenics, birth control, and sterilization, subjects usually taboo in this enlightened land.

BROWNE, T. J. The Health of the Woman Citizen as Potential and Actual Mother. *J. State Med.* 39, 12: 688 (Dec.), 1931.

**Milk-Borne Infections**—After listing at length all the infections that may be transmitted through milk, the author of this British contribution agrees with his "discussers" that pasteurization is likely to prove merely a veil to blind the public to the necessity for the elimination of tubercle infection from the milk supply.

BURROW, H. Bacterial Contamination of Milk and Its Significance. *J. Roy. San. Inst.* 52, 6: 234 (Dec.), 1931.

**Preventing Heat Cramps**—Loss of salt in sweat is the cause of heat cramps, which may be relieved by the prophylactic

administration of sodium chloride tablets.

GLOVER, D. M. Heat Cramps in Industry: Their Treatment and Prevention by Means of Sodium Chloride. *J. Indust. Hyg.* 13, 10: 347 (Dec.), 1931.

**Infra-Red Radiation**—"Many people feel stuffy and uncomfortable in a closed room warmed by a plenum system, or by dark or dull red sources of heat," says the author, introducing some observation which he concludes will alter the theory and practice of ventilation and heating.

HILL, L. The Influence of Infra-Red Radiation in Relation to Ventilation and Heating. *J. State Med.* 39, 12: 684 (Dec.), 1931.

**Typhoid Fever Via Milk**—"Eighty cases of typhoid fever occurring in Salisbury, Maryland, in July, 1930, were traceable to one milk supply. On the farm producing this milk a typhoid carrier was found. He had probably assisted in handling the milk on July 4."

HURDLE, S. H. A Milk-Borne Epidemic of Typhoid Fever in Salisbury, Maryland. *J. Prev. Med.* 5, 6: 465 (Nov.), 1931.

**Thyroid Prophylaxis in Two Cities**—Here is an interesting comparison. In Detroit, the state and city health departments, the school board and medical profession united upon a practical program to provide iodized table salt throughout the city (at no increased cost to the consumer). As a result the incidence of goiter was greatly reduced. In Cleveland, thanks to the exploitation of the possible danger that iodine might produce hyperthyroidism, the authorities abandoned a similar goiter prevention project and the medical profession was unable to agree on a plan. As a result, Cleveland continues to enjoy its incidence of thyroid enlargement.



KIMBALL, O. P. The Prevention of Goiter in Detroit and Cleveland. J. A. M. A. 97, 27: 1877 (Dec. 19), 1931.

**Adult Poliomyelitis**—In the epidemic studied, both sequelae and mortality rate were worse in adult cases than among children and serum therapy seemed far less encouraging.

LIMPER, M. A. *et al.* Poliomyelitis in Adults: Report of 60 Cases. J. Prev. Med. 5, 6: 475 (Nov.), 1931.

**Bacterial Dissociation**—Another contribution to our knowledge of bacterial dissociation. In this report the variations in the cultural characteristics of a coli-like organism are recorded. This paper may be read with profit by sanitarians who studied a "cut and dried" bacteriology.

NUNGESTER, W. J. and ANDERSON, S. A. Variation of a *Bacillus Coli-Like* Organism. J. Infect. Dis. 49, 6: 456 (Dec.), 1931.

**Septic Sore Throat Studies**—A general statement of the incidence, manifestations, and diagnosis of septic sore throat with a discussion of the bacteriology of *Streptococcus epidemicus*.

PILOT, I. and DAVIS, D. J. Sporadic Septic Sore Throat. J. A. M. A. 97, 23: 1691 (Dec. 5), 1931.

**Breast Feeding vs. the Bottle**—Don't miss this collection of opinions. Dr. R. M. Smith says, "Breast feeding is particularly important during first six weeks of life; it is desirable during first three months. . . ." Dr. W. P. Lucas says, "Except for conferring certain immunity, all other requirements are more easily met by a formula. . . ." Dr. C.

G. Grulee, "My own feeling is that the pendulum is swinging back to breast feeding. . . ." Dr. W. McK. Marriott, like his predecessors, admits the desirability of breast feeding; he does not argue against it, but is against "unintelligent fetishism." There is more to come in the next issue.

SMITH, R. M. *et al.* Are Infant Feeding Methods Changing? Pub. Health Nurs. 23, 12: 581 (Dec.), 1931.

**Mass Protection Against Measles**—A British discussion of the advisability of exposing infants to measles to be followed by a partially protective dose of convalescent serum. The limitations of alternate schemes are considered.

STOCKS, P. Some Observations on the Control of Measles Epidemics. Brit. M. J. 3699: 977 (Nov. 28), 1931.

**Mass Prophylaxis Against Colds**—Autogenous vaccine made from throat cultures was offered to a group of employees. Among the inoculated, 35 per cent lost time, whereas over 50 per cent of the untreated were absent because of catarrhal conditions.

STOWELL, T. E. A. Some Factors in the Reduction of Absenteeism Due to Catarrhal Conditions. Brit. M. J. 3699: 985 (Nov. 28), 1931.

**Cancer Research**—This report of very limited success in the treatment of epitheliomas with pituitrin plus theelin will probably become public property, for it has been mentioned in a news magazine. Health officials should be cognizant of this paper.

SUSMAN, W. The Rôle of the Pituitary in the Etiology of Cancer. Brit. M. J. 3695: 794 (Oct. 31), 1931.

## NEWS FROM THE FIELD

### FRENCH EQUATORIAL AFRICA

**I**NFANT health centers have been established in French Equatorial Africa, in some districts of which one-half of the infants die in their first year. This high mortality rate is attributed mainly to the ignorance of the native mothers. At the infant health centers, the public health physicians in the service of the French Government examine the children and teach the mothers the rules of hygiene. In order to assure attendance, gifts are distributed to the mothers, such as clothing for the children, soap, salt, and other things; larger gifts are given to mothers whose children show evidence of good care. Contests with money prizes are also being held. As a result of this work, in 2 years the infant mortality has decreased 8 times in one place and 20 times in another.

In some places groups of European women have organized prenatal and child health work among the natives. They maintain health centers, employ physicians and native visiting nurses, and distribute aid to mothers of little children.

In some of the important centers of population, training courses are provided for native midwives who are later stationed in the villages. Maternity hospitals have also been built in a number of places with funds obtained partly from the Government and partly from private sources.

Similar work is being done in French West Africa where, in addition, health centers have been established for school children and steps have been taken for the improvement of the vital statistics pertaining to the native children.—Of-

fice International d'Hygiène Publique, *Bulletin Mensuel*, Paris, Oct., 1931, pp. 1829, 1834.

### PUBLIC HEALTH CODE OF CHILE

**T**HE recently published public health code of Chile has a section on the health of mothers and children. Among other things, it orders the National Department of Health to establish health centers for expectant mothers and children. The department will also supervise the work of all institutions or agencies concerned with the welfare of the mother and child, whether public or private, whenever they are subsidized by the State. The health work of the State is to apply to children from birth until the end of the school attendance period and to mothers from the beginning of pregnancy until the end of the 6th month after the child's birth. Besides health work, the State is also to give other forms of aid to mothers and children, the details of which are to be prescribed in later regulations. Dependent mothers and children in the above mentioned periods of their lives are to be given free maintenance in public institutions.

No mother is allowed to nurse another child before her own is 5 months old, unless a physician certifies that she is able to nurse two children at the same time. This fact must be reported to the public health authorities, who are required to investigate the case.

The preventive health work for school children will be in charge of the National Department of Health; private schools must maintain medical service for their pupils in accordance with the rules of the department.

Dental clinics for mothers and children are to be established in the larger cities.—*Diario Oficial de la República de Chile*, July 6, 1931.

#### MATERNAL AND CHILD HEALTH CENTERS IN FRANCE

A STRONG movement is now going on in France for an increase in the number of maternal and child health centers as a means of checking infant mortality. Several of the departments of France have established such centers, but it is considered important to extend the system to the entire country, both urban and rural districts. For this purpose, the Minister of Public Health recently issued a circular to the prefects urging them to establish such centers throughout their respective departments and prescribing in detail their organization and functions. Several bills for that purpose are pending in the French Parliament, but the Minister considers this matter too urgent to wait until the bills are passed.—*La Revue Philanthropique*, Paris, Oct. 15, 1931, p. 797.

#### ADDITION TO NEW YORK ACADEMY OF MEDICINE PLANNED

ON January 10, at the annual meeting, announcement was made by Dr. Linsly R. Williams, director of the academy; that construction of a \$400,000 addition to the New York Academy of Medicine would begin in the near future.

Prior to the meeting a testimonial dinner attended by more than 200 fellows of the Academy was given in honor of Dr. Williams. In his address the director reviewed the activities of the academy during the last 8 years and outlined some of its plans for the future.

#### RESOLVED!

ON October 29, 1931, about 3 years after the organization of the Suffolk County Department of Health, the following resolution was unanimously adopted by the Suffolk County Medical

Society (N. Y.) at the largest annual meeting in its history:

RESOLVED, that the Suffolk County Medical Society hereby reaffirms its opinion first expressed in 1926 that public health administration can only be efficiently done by county organization (to replace township part-time organization); that after 3 years of experience the local profession more strongly than ever believes that the efficiency of public health practice is greatly improved by county organization; and that the physicians of the county have found that a county health department is an asset in their professional work and an asset to their economic welfare.

#### TEXAS WATER WORKS SHORT SCHOOL

THE Fourteenth Texas Water Works Short School was held at Mineral Wells, Tex., January 18-21. The program covered water supply, and sewage practices in general.

#### PERSONALS

DR. HAVEN EMERSON, F. A. P. H. A., was recently appointed by the President of the Merchant's Association of New York to succeed the late Professor Olin H. Landreth as Chairman of the Association's Committee on Sanitation, Public Health and Water Supply.

DR. JOHN W. MORR, of Albion, Ind., has been appointed Health Officer of Noble County, Ind., to succeed the late Dr. John H. Ravenscroft.

DR. THOMAS E. CARNEAL, of Winamac, Ind., has been appointed to fill the unexpired term of Dr. George W. Washburn, of Star City, Ind., who has resigned as Health Officer of Pulaski County, Ind.

DR. ALVIN H. ROCKWELL, member A. P. H. A., for 23 years Health Officer and Director of Health and Welfare of Kalamazoo, Mich., has resigned as of January 1.

DR. ALFRED F. HESS, of New York, member A. P. H. A., was recently elected to honorary membership in the German Pediatric Society.

DR. I. F. THOMPSON, F. A. P. H. A., of Syracuse, N. Y., has been appointed to succeed Dr. W. W. Bauer as the Health Officer of Racine, Wis.

DR. T. H. JOHNSTON, member A. P. H. A., of Athens, Ga., has resigned as secretary-treasurer of the Georgia State Public Health Association and Victor H. Bassett, M.D., has again been appointed to serve as secretary.

DR. C. W. DECKER has been appointed to succeed Dr. George Parrish as City Health Officer of Los Angeles, Calif.

April 19-23, 37th Annual Convention of the American Physical Education Association, Philadelphia, Pa.

May 10-15, Annual Congress of The Royal Institute of Public Health, Belfast, Ireland.

June 2-4, Third Annual Meeting, Western Branch, American Public Health Association, Denver, Colo.

June 6-9, National Tuberculosis Association, Colorado Springs, Colo.

### CONFERENCES

April 4-8, American College of Physicians, San Francisco, Calif.

April 11-15, American Nurses Association, San Antonio, Tex.

April 11-15, National Organization of Public Health Nursing, San Antonio, Tex.

April 11-15, National League of Nursing Education, San Antonio, Tex.

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450 SEVENTH AVENUE  
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# American Journal of Public Health

## and THE NATION'S HEALTH Vol. XIV No. 3

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### Study in the Epidemiology of Diphtheria in Relation to the Active Immunization of Certain Age Groups<sup>\*†</sup>

EDWARD S. GODFREY, JR., M. D., F. A. P. H. A.

*Director, County Health Administration, State Department of Health,  
Albany, N. Y.*

IT has long been known that it is not necessary to destroy every Anopheline in a region to rid it of malaria; that the vaccination of much less than 100 per cent of a population is quite effective in preventing the spread of smallpox; that epidemics of measles cease long before the susceptibles are exhausted. But since it is commonly believed that diphtheria is usually spread by healthy carriers, grave doubt exists whether anything less than the immunization of the entire child population will suffice to reduce this disease to negligible proportions. However, several experiences in New York State during the past 9 years have seemed to indicate that if certain minor fractions of the population be immunized an epidemic of diphtheria will not occur or if present, will promptly subside after these fractions have been immunized. The determination of this question therefore is of great practical importance.

It can be taken as reasonably well proved that a considerable majority (65-95 per cent) of those given 3 injections of either toxoid or toxin-antitoxin thereby become immune to the disease. If this be all that happens then diphtheria will only be reduced among those treated and only to the extent that those treated actually become immune. On this assumption if half the children age 0-14 years are given 3 doses

<sup>\*</sup> Read before the Health Officers Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 14, 1931.

<sup>†</sup> This is a part of a study to determine the effectiveness of procedures for the reduction of diphtheria, assisted by a grant from the Commonwealth Fund and under the auspices of the American Public Health Association through its Committee on Administrative Practice.

TABLE I

DIPHTHERIA DEATH RATES PER 100,000 POPULATION, AND PER CENT OF POPULATION IMMUNIZED \*  
BY AGE: NEW YORK STATE, EXCLUSIVE OF NEW YORK CITY AND ROCHESTER, 1920-1930

Year	Deaths per 100,000 population at age:				Per cent of population immunized at age:			
	All ages	Under 5 years	5-9 years	10-14 years	All ages	Under 5 years	5-9 years	10-14 years
1920	17.2	103.2	55.5	15.9				
1921	16.1	87.5	58.4	17.1				
1922	11.3	62.2	43.9	11.1	0.2	*	1.2	1.2
1923	8.8	56.6	27.2	6.7	0.8	0.4	4.0	3.3
1924	7.3	46.6	20.7	6.4	1.4	1.7	7.2	5.0
1925	5.8	33.4	19.4	6.2	1.9	1.5	10.3	6.8
1926	4.4	24.8	15.8	5.2	4.0	5.2	21.8	14.3
1927	4.7	29.7	17.1	3.6	8.0	12.3	41.1	28.9
1928	4.0	24.9	13.4	3.5	10.3	16.1	47.7	40.9
1929	3.6	22.3	13.3	3.2	12.8	21.1	55.2	51.0
1930	2.6	16.5	7.7	1.7	15.0	25.3	60.6	60.1

\* As of Dec. 31 of year stated.

of antigen and three-fourths of them become Schick negative only three-eighths of this age group would be protected. As three-fourths of the cases occur during this age period the diphtheria case rate should be reduced only by  $9/32$ , or approximately 28 per cent. On the same assumption, if only half as many children under 5 years be immunized

TABLE II

DIPHTHERIA DEATH RATES PER 100,000 POPULATION, AND PER CENT OF POPULATION IMMUNIZED \*  
UNDER 15 YEARS OF AGE: PLACES OVER 10,000 AND UNDER 10,000 POPULATION IN NEW  
YORK STATE, EXCLUSIVE OF NEW YORK CITY AND ROCHESTER, 1920-1930

Year	Deaths per 100,000 population in places:		Per cent of population immunized under 15 years of age in places:	
	Over 10,000	Under 10,000	Over 10,000	Under 10,000
1920	25.8	8.6		
1921	22.6	9.5		
1922	14.6	8.1		
1923	11.4	6.2	1.3	0.3
1924	9.7	4.8	4.1	1.1
1925	7.1	4.5	7.1	2.3
1926	5.9	2.9	9.1	3.5
1927	5.8	3.7	17.1	11.0
1928	5.3	2.7	31.7	24.2
1929	4.7	2.5	41.1	30.1
1930	3.3	1.9	50.5	36.2
			58.9	40.7

\* As of Dec. 31 of year stated.

as children 5-9, the effect should be to reduce the incidence in the latter group twice as much as in the former.

As a matter of fact neither of these things seems to happen. Although in New York State more than twice as many children age 5-9 have been given toxin-antitoxin than age 0-4 the specific age death rates have declined with remarkable parallelism (Table I). Furthermore, this parallelism is equally striking in the rates for places over and places under 10,000 population despite a preponderance of immunizations in the former (Table II). These observations may be interpreted either as indicating that the recent decline in diphtheria is independent of active immunization, or at most only assisted by it—or that the protection of a certain part of the community affords a general protection and that a protected urban center serves to reduce the incidence in adjacent territory.

Efforts to prove a causal relationship between active immunization and declining annual diphtheria death rates by merely measuring deviations from a trend are quite unconvincing to one acquainted with

FIGURE I  
CASE AND DEATH RATES PER 100,000 POPULATION: AUBURN, 1913-1930

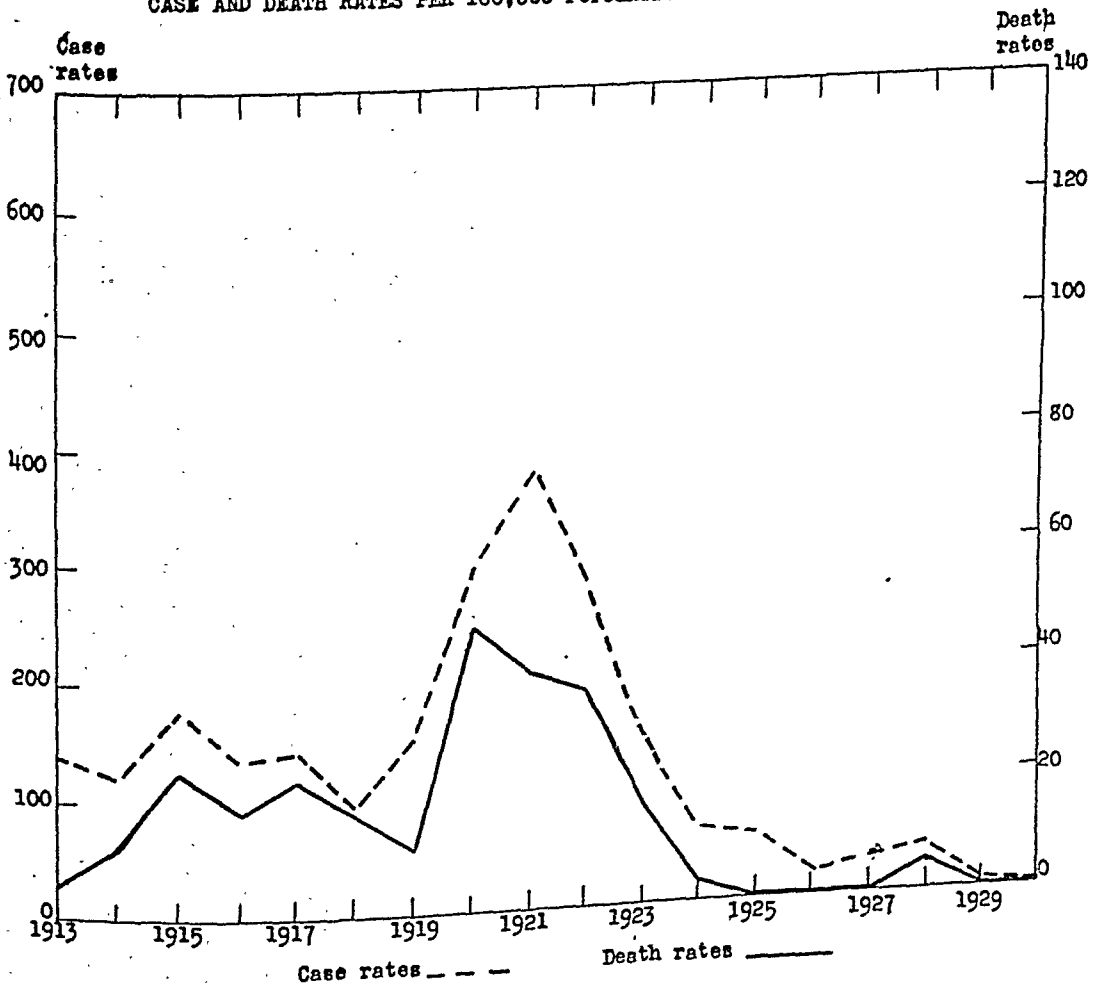
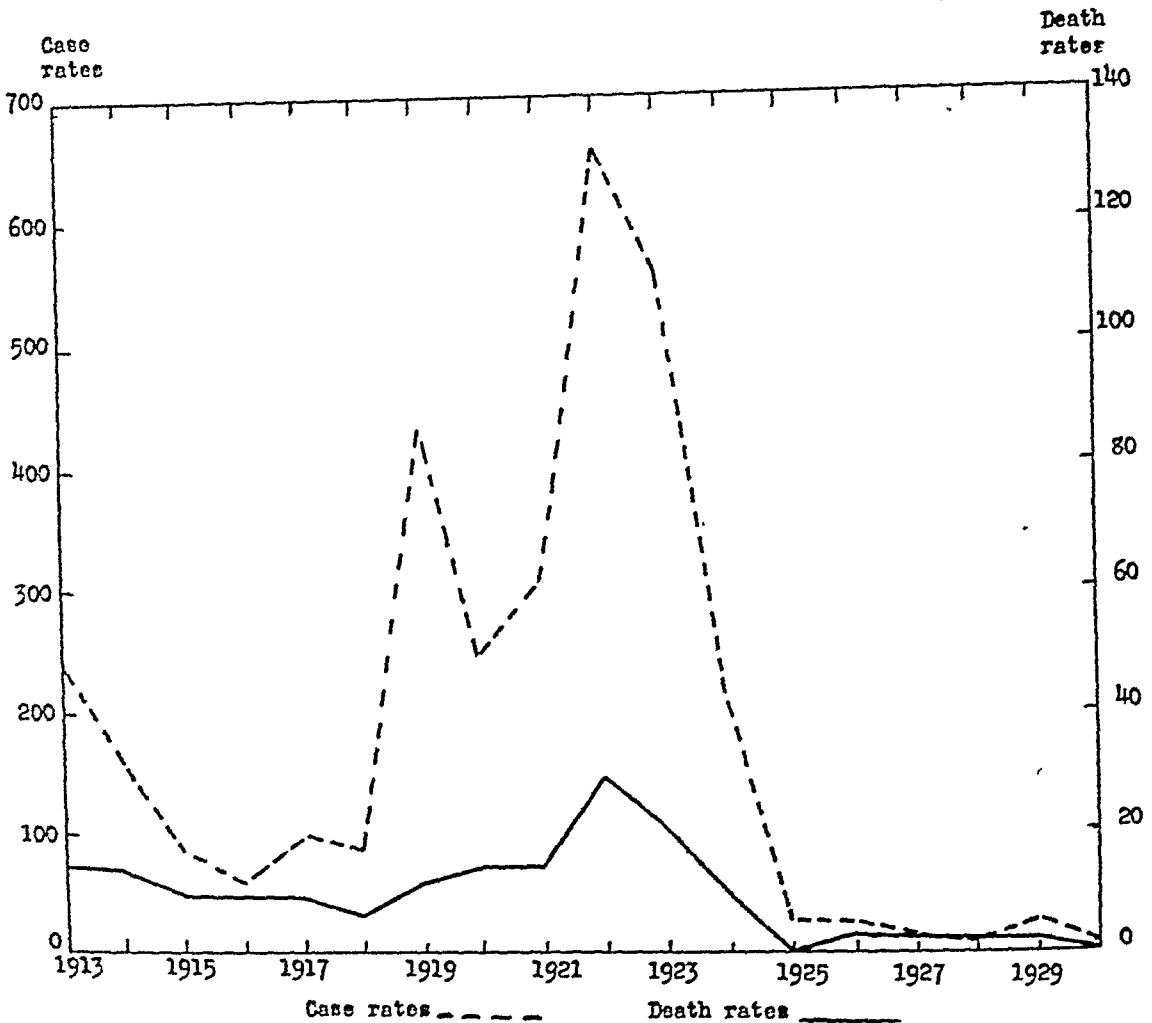


FIGURE II

CASE AND DEATH RATES PER 100,000 POPULATION: AMSTERDAM, 1913-1930



the behavior of these rates when unaffected by factitious influences. On the basis of their annual diphtheria death rates it is quite impossible to determine whether Auburn (Figure I), or Amsterdam (Figure II) was the scene of the first community-wide toxin-antitoxin drive, yet several thousand children were immunized in the former city and only 300 in the latter. Furthermore, if the declines in the death rates in New York City and Philadelphia can be attributed to large but indefinite numbers of immunizations, how do we account for the failure to produce a like effect in Newark, Detroit, and Buffalo?

It is believed that the answer may lie in two generalizations induced from certain observations made during the past 9 years which may be stated as follows:

1. The attainment of a high degree of herd immunity among children 5-9 and 10-14, as evidenced by the injection of 3 doses of toxin-antitoxin in 50 per cent or more of the members of these groups, produces no definite effect on the diphtheria



incidence in that community. Diphtheria if prevalent continues prevalent for a considerable period and declines gradually as it does when active immunization is not used. If not prevalent an outbreak of considerable proportions may arise.

2. However, when the immunization of approximately 30 per cent or more of the children under 5 years is superimposed, there is an immediate definite decline in the current prevalence, and if the community be free from the disease or if its prevalence be low an outbreak is very unlikely to occur.

*In other words, there is a critical point in the under 5 age group which must be attained and sustained in order to affect the diphtheria rate favorably.*

Whether the immunization of 30 per cent or more of the under 5 age group would be effective without any immunizations among older children cannot be determined. There is no evidence on this point and it seems unlikely that any community will so strictly limit immunizations to children under 5 years as to provide that evidence.

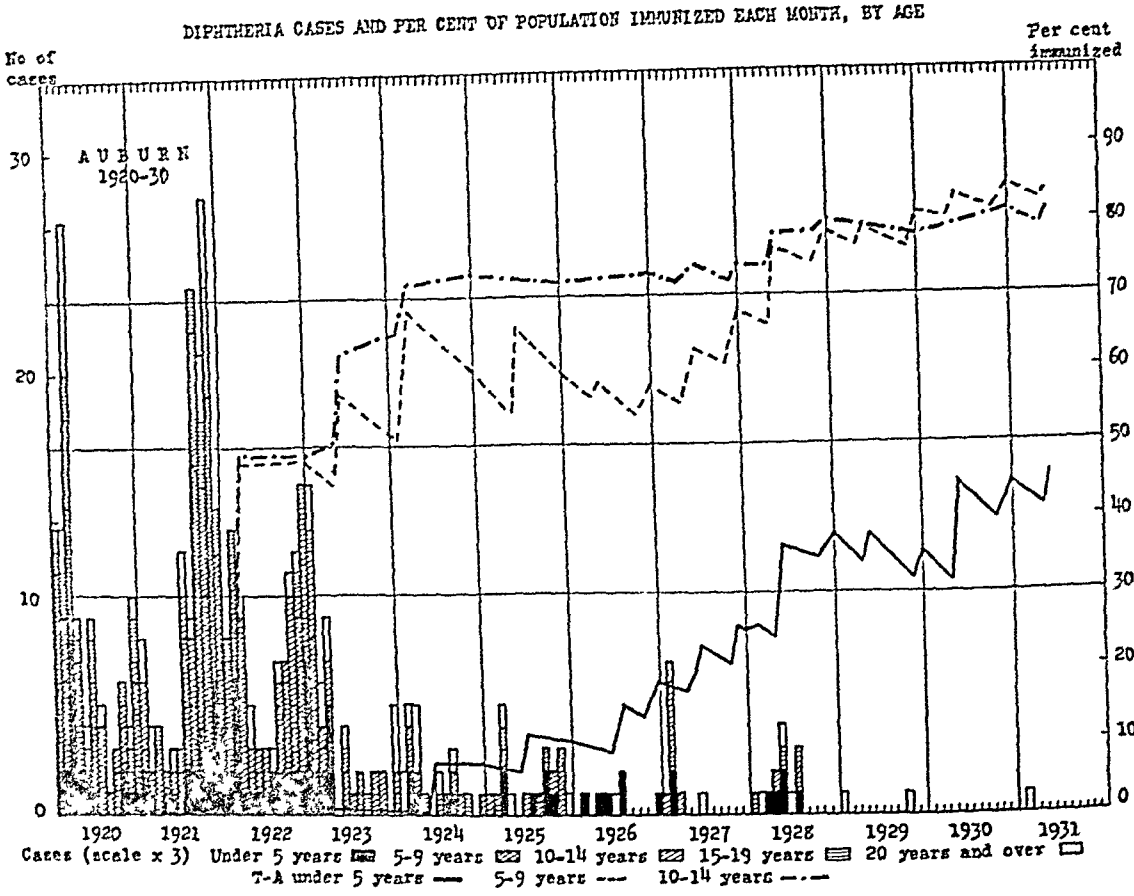
The observations which have led to the above hypothesis and a brief attempt to rationalize it with our knowledge of the epidemiology of diphtheria follow:

Auburn, N. Y., as everyone knows, was the scene of the first attempt to eradicate diphtheria on a community-wide basis through the use of toxin-antitoxin. As will be seen in Figure III (see note), the disease had been prevalent for 3 years when in February, 1922, the campaign was started by Dr. Sears. It will be noted that during this early period (1) nearly 50 per cent of the children age 5-9 and 10-14 were either found Schick negative or given 3 doses of toxin-antitoxin; (2) the 0-4 age was neglected; (3) there was a recrudescence of the outbreak in the fall and winter of 1922-1923; (4) in this city of 30,000 although never attaining the proportions of an outbreak diphtheria continued present almost every month for over 3 years and was not effectively curbed until after July, 1928; (5) in May, 1928, the cumulative percentage of children under 5 years first reached 30 per cent of those in this group; (6) the proportion of children 5-9 and 10-14 increased to 60 per cent and 70 per cent respectively without marked effect on the residual diphtheria.

The recrudescence in the fall of 1922 was attributed at the time to the belief that it required 6-9 months to produce immunity with the toxin-antitoxin then in use. It is now believed that it was due to the

NOTE: The declination in the lines showing the percentages of children immunized is based on the assumption that one-twelfth of the children age 4 will graduate each month into the age group 5-9. Hence, if the immunizations in the group over a period of time are fewer than the graduations from it, the percentage of immunized children in that group will fall accordingly. Similarly the children in the 5-9 age group are assumed to graduate at a uniform rate into the group 10 years and over. The losses in this group, however, may be more or less counterbalanced by graduations from the age group below it.

FIGURE III



fact that children in the under 5 age group were not reached and that the subsequent decline in diphtheria could in large part be attributed to the usual recession from a period of high prevalence.

Nearly 5 years later, in the fall of 1926, Newburgh, N. Y., population 30,000, carried out a campaign of immunization during an epidemic that had lasted about 18 months (Figure IV). Normally we should have expected it to last through the succeeding winter probably attaining its maximum for the epidemic year in December or January. Observe that approximately 35 per cent of the 0-4 and 65 per cent of the 5-9 age groups were treated during a period of about 6 weeks. Note also the almost complete disappearance of diphtheria immediately following and its continued absence.

In the spring of 1927 a similar campaign was carried out in Utica, N. Y., population 100,000 (Figure V). The administration of toxin-antitoxin during 1926 to 7,000 school children, comprising 40 per cent of the 5-9 age group, 30 per cent of the 10-14 group and only 2 per cent or 3 per cent of the under 5 group, had had no effect on the mass incidence the following winter. The 1927 campaign raised the 5-9 group to 60 per cent, the under 5 group to nearly 40 per cent and the

FIGURE IV

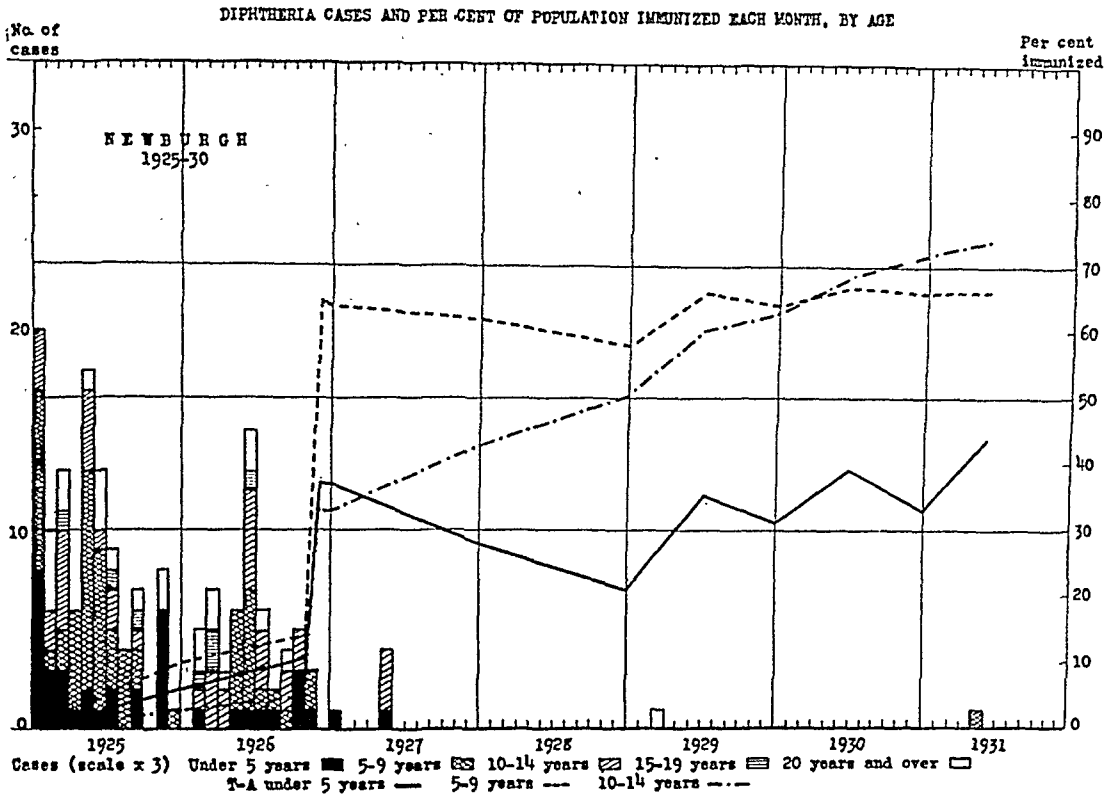


FIGURE V

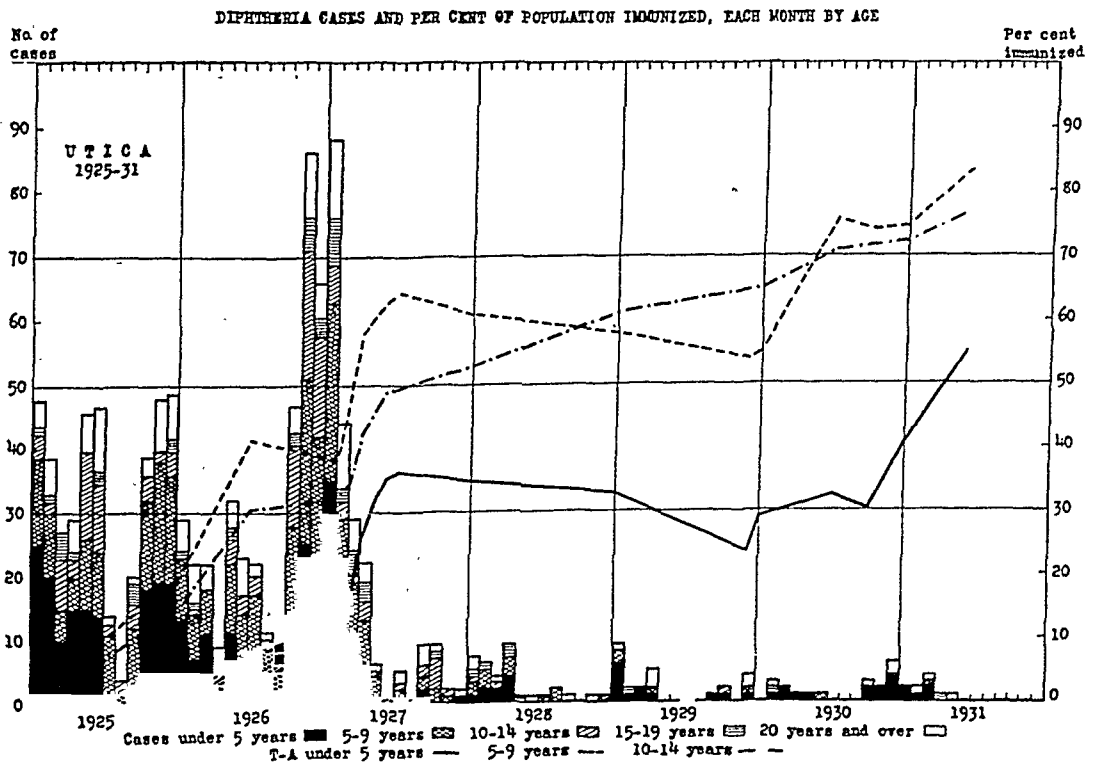
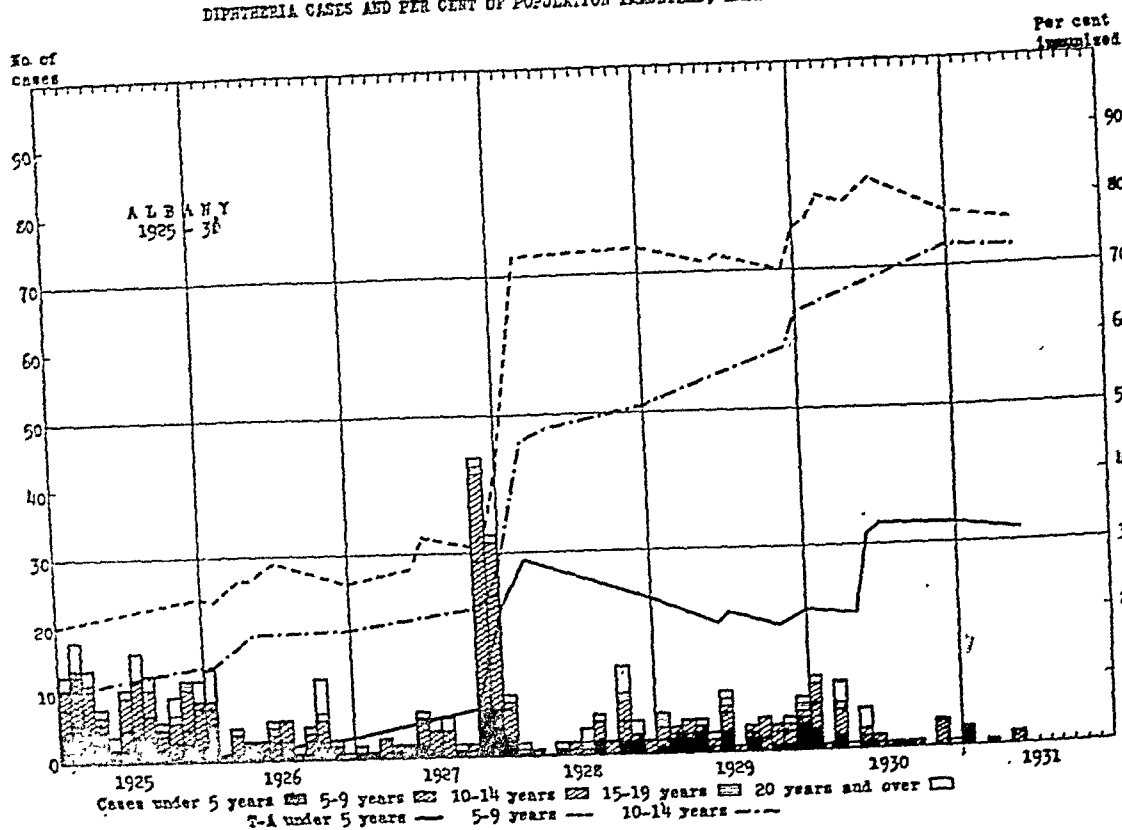


FIGURE VI

DIPHTHERIA CASES AND PER CENT OF POPULATION IMMUNIZED, EACH MONTH BY AGE



decline was immediate and rapid. The percentages have been quite well maintained and the diphtheria incidence has remained low. It is possible that the decline in Utica may have been simply a recession from an epidemic. An examination, however, of the monthly incidences of diphtheria unaffected by toxin-antitoxin in 22 cities of more than 25,000 population covering a period of 23 years fails to disclose an instance of as rapid a decline with a subsequent incidence so low.

The next example occurred in Albany, N. Y. (Figure VI), population 120,000. Approximately 5,000 children had been given toxin-antitoxin during the 2-3 years preceding the beginning of a quite explosive outbreak late in 1927. The northern section of the city was the principal focus and an immediate campaign was initiated designed primarily to reach children under 5 years. The immunizations were concentrated at first on the affected district but extended later to all parts of the city. The outbreak promptly subsided though a little less than 30 per cent of the under 5 age group were given toxin-antitoxin. It is highly probable, however, that a much higher percentage was attained in the affected district. Due to graduations, the percentage of children under 5 diminished to 20 per cent during 1929 where it remained until 1930 when another drive placed the figure above 30 per cent. The reduced endemic incidence since then is apparent.

This outbreak is among those deserving further study. No evidence that it was milk-borne was adduced and the age distribution is against this hypothesis.<sup>1</sup> On the other hand, the question arises as to what percentage of children in the different age groups living in the affected area were given toxin-antitoxin. Unquestionably it was much higher there than in the city at large. The continued presence of rather numerous cases until the latter part of 1930 shows that the city as a whole was not well protected. The geographical distribution of those later cases is another point yet to be investigated. Have they occurred in those parts of the city that have been relatively neglected or has the area of intensive work had its full share?

Niagara Falls (Figure VII), population 75,000, had given toxin-antitoxin to over 6,000 children and reached approximately 60 per cent of the children 5-9 by the end of 1927. Diphtheria had been prevalent the preceding winter and spring, continued at a lower rate through the summer and increased sharply in January, 1928. A well conducted drive by the city health officer resulted in raising the 5-9 age group to over 70 per cent and the under 5 age group from less than 10 per cent to over 40 per cent in the course of a few weeks. Note the marked drop immediately following and the comparative absence of cases until this past winter. This increase seems to be an exception to the rule and will be discussed further.

FIGURE VII

DIPHTHERIA CASES AND PER CENT OF POPULATION IMMUNIZED EACH MONTH, BY AGE

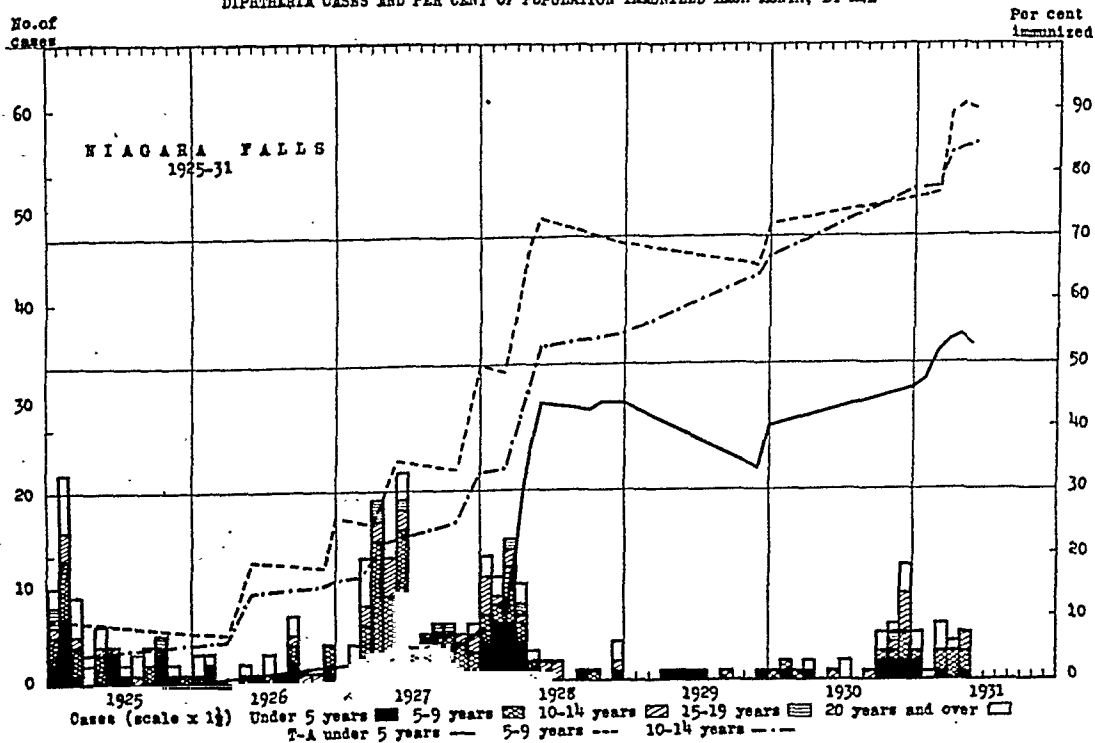
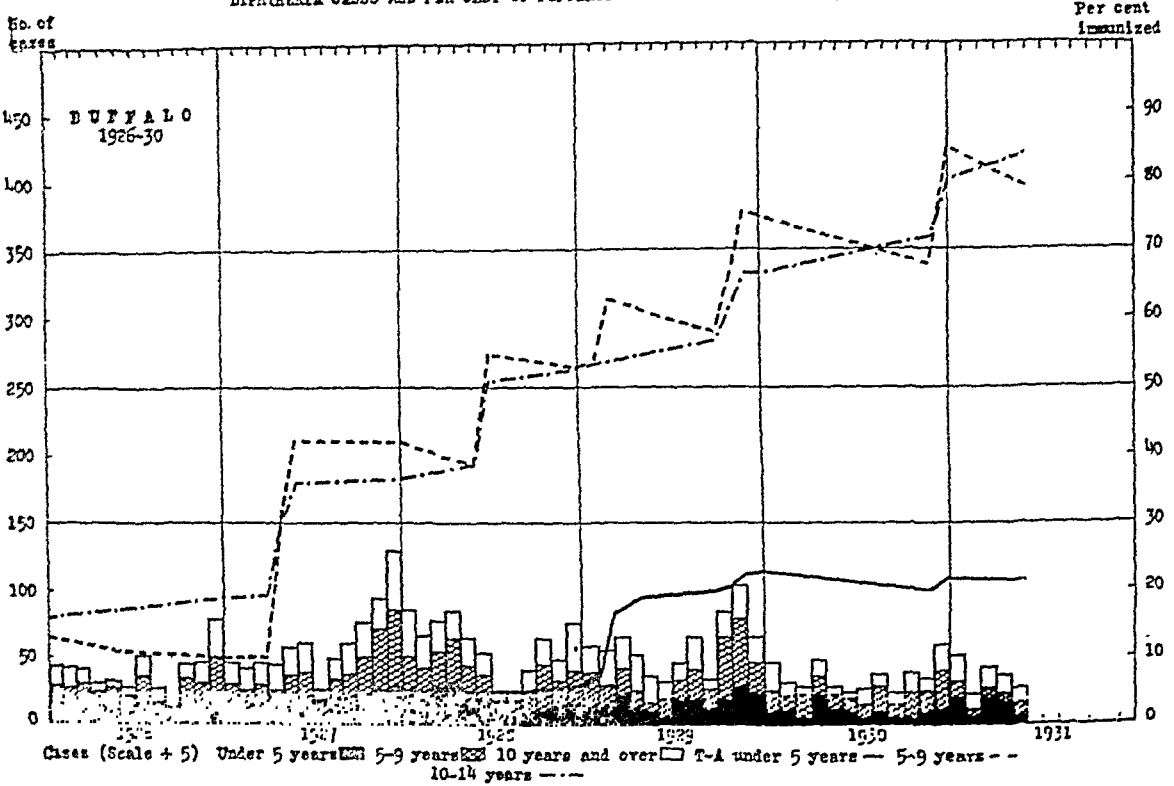


FIGURE VIII

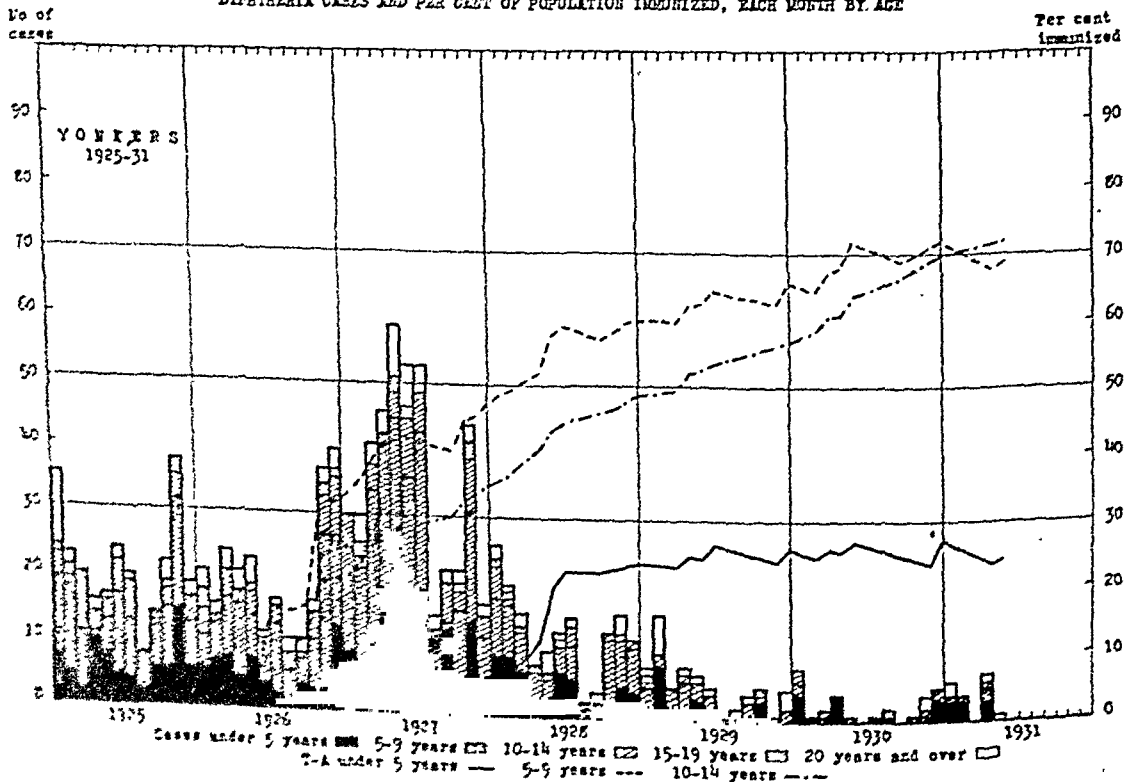
DIPHTHERIA CASES AND PER CENT OF POPULATION IMMUNIZED EACH MONTH, BY AGE



Figures VIII and IX are to illustrate the failure to produce a marked effect on the community incidence of diphtheria through giving toxin-antitoxin to 50 per cent or more of children age 5-9.

FIGURE IX

DIPHTHERIA CASES AND PER CENT OF POPULATION IMMUNIZED, EACH MONTH BY AGE



If one be satisfied with mere numbers, Buffalo's effort should be most gratifying. Three doses of toxin-antitoxin were given to 28,800 children in that city in 1927, to 17,700 in 1928, 31,000 in 1929, 16,000 in 1930. During the 6 years ending December, 1930, it had been given to 95,935 individuals, an impressive number, though not an extraordinary percentage of the population. The age distribution of those given toxin-antitoxin and the failure of this work to produce any marked effect on the diphtheria incidence are shown in Figure VIII. More than 50 per cent of the age group 5-9 has been protected since the middle of 1929, and the attainment of even 70 per cent in this group plus over 20 per cent in the under 5 year group, has not sufficed to reduce materially the diphtheria incidence.

In Yonkers, population 130,000 (Figure IX), the period of high prevalence began in 1923, attained its maximum in 1927, and declined slowly through 1928 and the first half of 1929 when it became stabilized. Giving toxin-antitoxin to 50 per cent of the 5-9 age group and even 70 per cent of this group plus 25 per cent of the under 5 group produced no striking effect on the diphtheria incidence; except that stabilization is at a much lower figure than any ever previously attained by this city, the decline might well be due to "natural causes."

Failure to prevent a sharp increase in cases though 50 per cent of the 5-9 age group have been treated is illustrated by the following examples:

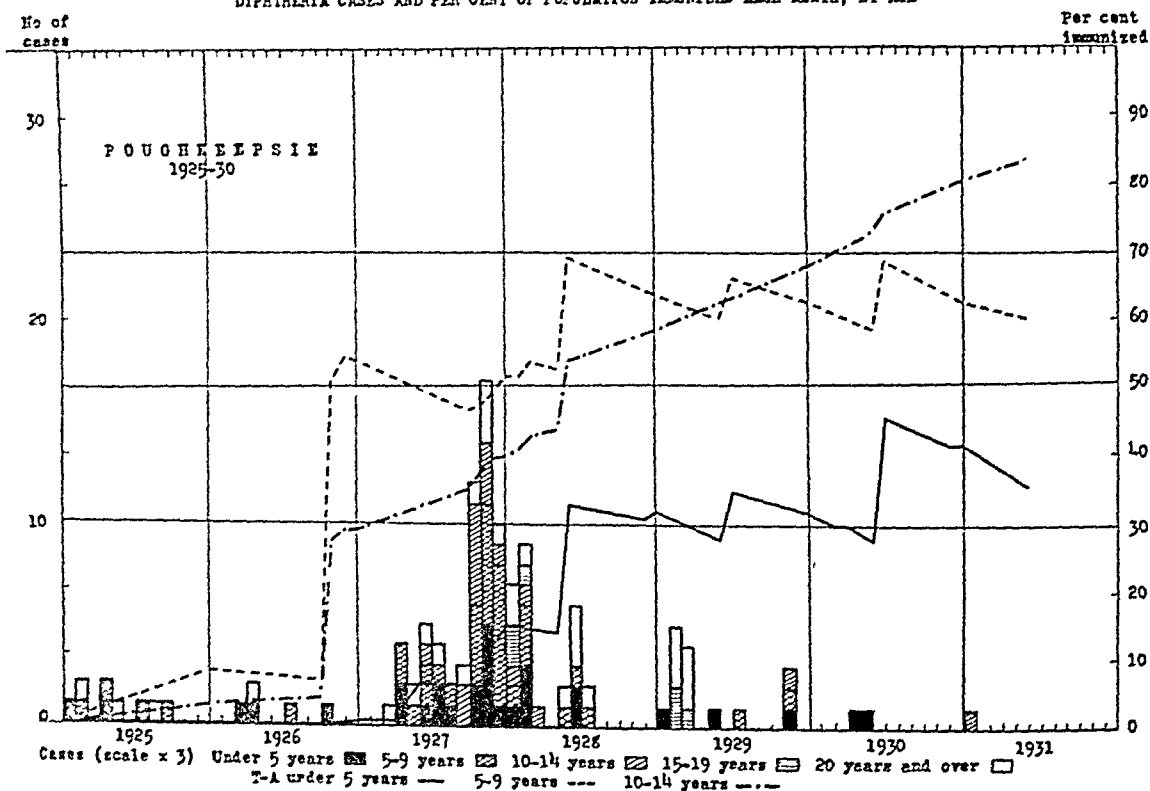
Poughkeepsie (Figure X), population 40,000, experienced an increase of cases beginning in the spring of 1927 and culminating the following fall and winter although about 50 per cent of the 5-9 age group had been given toxin-antitoxin. Following a drive in the late spring of 1928 during which slightly more than 30 per cent of the under 5 year group were given toxin-antitoxin there were no cases during the last 5 months of the year. The occurrence of 15 cases the following year despite the fact that the 5-9 age group was held at from 60 per cent to 70 per cent and the under 5 group never got much below 30 per cent suggests that these percentages afford little or no margin of safety.

Cohoes (Figure XI), population 23,000, after a 3-year period of high prevalence, had a well marked increase in the late fall of 1929 despite a 50 per cent protection of the 5-9 age group. The gradual rather than sudden subsidence may be noted. The occurrence of but 2 cases during the 11 months ending June 1, despite failure to immunize 30 per cent of the under 5 age group, is not unusual in places of this size.

*Exceptions*—A search of our records for the past 5 years has dis-

FIGURE X

DIPHTHERIA CASES AND PER CENT OF POPULATION IMMUNIZED EACH MONTH, BY AGE

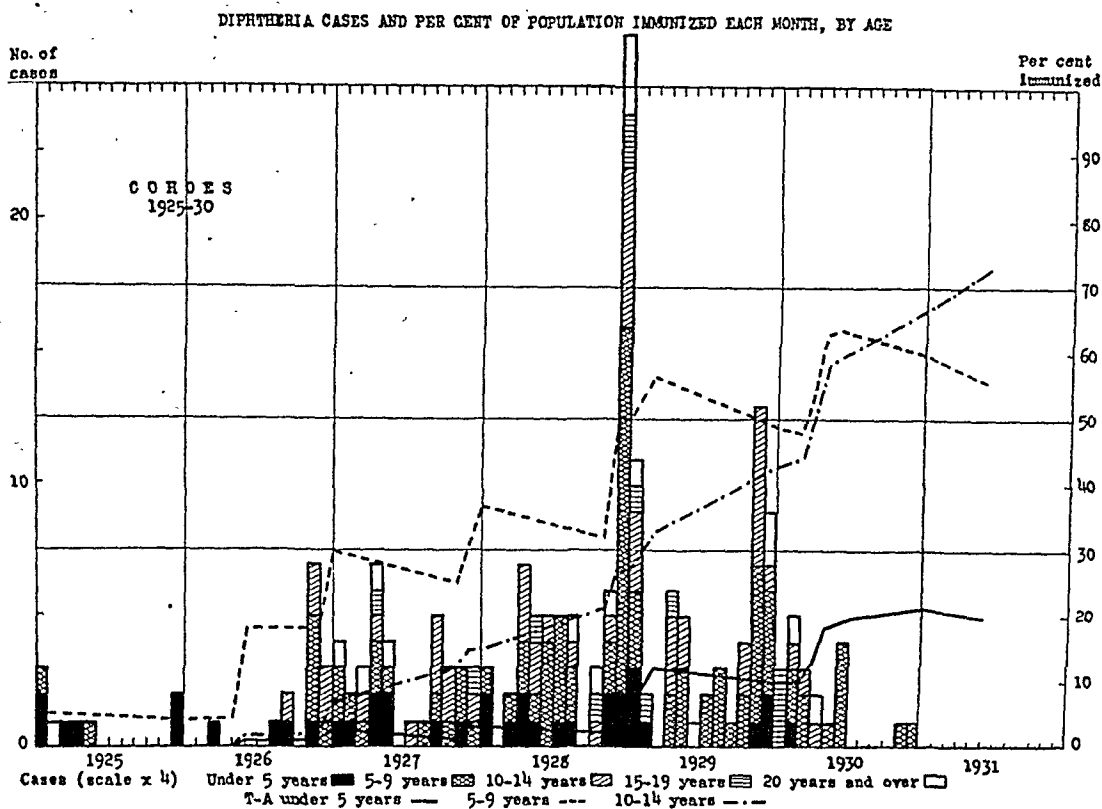


closed 2 instances of sharp increases in the diphtheria incidence in places having 30 per cent or more of the under 5 age group protected. One of these, that in Niagara Falls (Figure VII), has already been alluded to, the other was in the village of Port Chester, population 20,000, in the late spring and early summer of 1929 (Figure XII). They are both being studied further, neither study being as yet complete. However, as together they indicate something of the method of approach, the material is presented for information and discussion.

In Niagara Falls the geographical relations of the cases to the births occurring during 1930 have been studied; the births being taken as an index of the distribution of the child population. The area of prevalence in the recent outbreak has also been compared with the preceding one in 1927-1928. The two have been found to overlap only in the central southern part of the city. In relation to the birth map the earlier outbreak was found to conform more closely to the child population distribution than the recent one although one densely populated area was but little affected in either outbreak. It is proposed next to study the geographical distribution of the children who have had toxin-antitoxin both in relation to the births and to the cases of diphtheria. Whether an approximate numerical relationship can be obtained is of course to be determined.



FIGURE XI



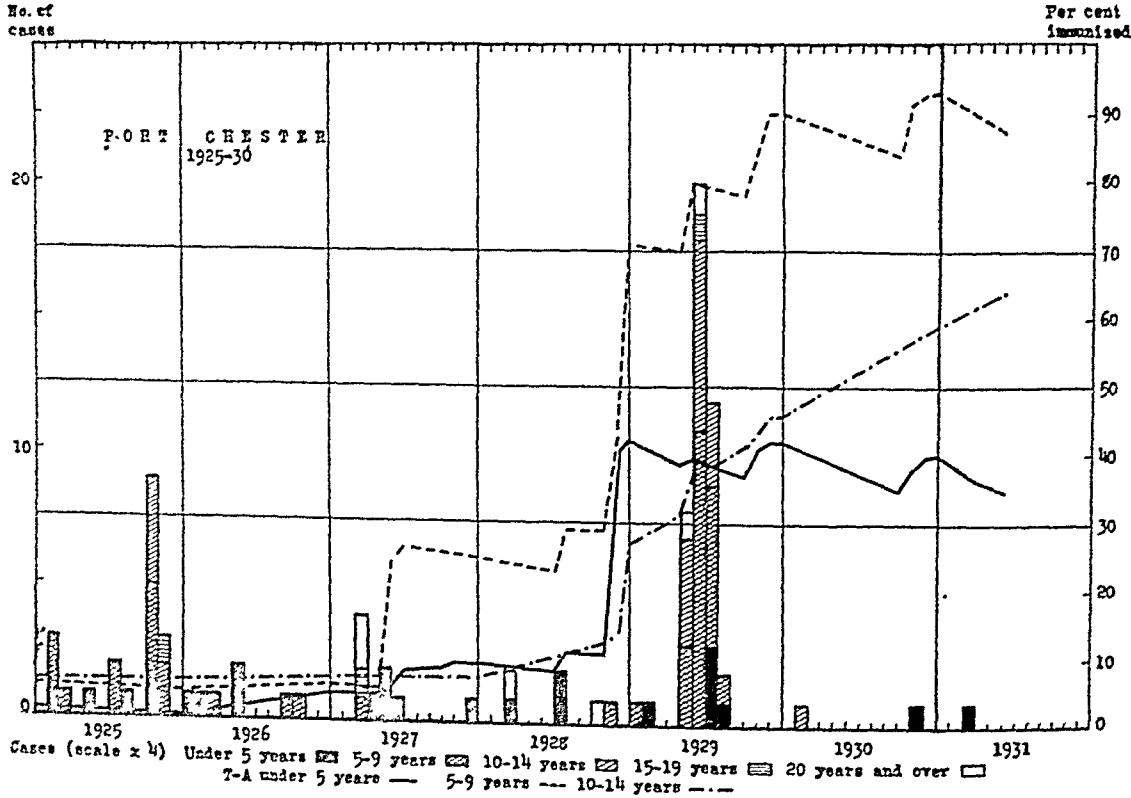
In Port Chester the geographical relationship of the cases to the children given toxin-antitoxin has been studied through a spot map showing the location of cases and immunized children. This map was kindly prepared for me by Dr. W. A. Holla of the Westchester County Health Department from the village records. The next step will be to relate cases and immunizations to the distribution of the child population.

The outbreak itself deserves a brief description since it represents much more complete case reporting than is found in the ordinary run of outbreaks. Furthermore it is not an exaggeration due to the inclusion of carriers. Every case included, I am informed, either had definite clinical symptoms of diphtheria when seen by a physician or gave a clear history of an attack that could not well be interpreted otherwise. The completeness of reporting was due to the activity of the village nurse who ferreted out the cases both among the known contacts and the children of the neighborhood. It is worthy of mention that all of these cases could be attributed to contact with a prior case, missed or recognized, but in any event an individual with a pathological condition that could have been due to the diphtheria bacillus.

We were informed upon inquiry that the section of the village in

FIGURE XII

DIPHTHERIA CASES AND PER CENT OF POPULATION IMMUNIZED EACH MONTH, BY AGE



which this outbreak occurred had not responded as well as other sections in having the children given toxin-antitoxin. This contention is not borne out by Dr. Holla's map. Obviously, however, the density of the child population in this area is a factor and no distinction is made on the map of immunized children over and under 5 years old. These are points for further investigation.

Of exceptions outside New York State the only one I have been able to discover is Detroit. Vaughan and Buck<sup>2</sup> have recently described the work in that city and I have since received further data from Dr. Gudakunst of the Detroit Health Department. The figures published in Vaughan and Buck's article indicate that only 21 per cent of the under 5 age group had been "immunized." It is important to note that the age group for which they give a "protection percentage" of 29.12 includes children up to 6 years. In New York we have adhered to the standard age groupings both because of convenience in comparing with morbidity, mortality, and population, and because age, rather than school attendance, is the important factor in determining mortality and preventing morbidity.

On the 21 per cent basis Detroit does not constitute an exception. However, during the first quarter of 1931 a canvass of some 91,000 children under 5 indicates that 58.3 per cent had been treated, a large

portion of them presumably during recent months. The effect on the morbidity rate has not been particularly striking. The unique system for diphtheria prevention being followed in Detroit, and the fact that the figure mentioned represents the results of a canvass requires further investigation to determine to what degree their records compare with ours. It would appear from comparing the reports on toxin-antitoxin in cities in New York State made to the White House Conference with those we have compiled in the State Health Department from the reports of local health officers that the latter tend to minimize and the canvass or census tends to exaggerate the actual degree of protection. Out of 9 cities in only 3 was the agreement as close as 5 per cent, one of these 1 per cent lower, the other 2 higher. In all the others the conference rating was from 6 per cent to 17 per cent higher. As the conference used the abominable under 6 years age grouping and as many more children have been given toxin-antitoxin at age 5 than at any lower age, it is probable that the agreement is closer than appears.

As it is hoped to accumulate comparable data from a large number of places during the next few years, a high degree of uniformity in the method of collecting and tabulating immunization statistics is a necessity. It seems desirable, therefore, to describe in some detail the methods we have worked out in New York State during the past 7 years, not with the idea that they are necessarily the best, but because we probably have more data, tabulated uniformly, to serve as a basis of comparison than can be found anywhere else. Any community that has good primary records of toxin-antitoxin administration can with more or less trouble follow this system and determine its approximate immunization status as of any given date.

The primary data come to the local health officer from four different sources: The practising physicians, school clinics, regular children's clinics and special toxin-antitoxin clinics. Forms have been devised to facilitate record making for each of these but the form most widely used is known as Form 50; the "Request Card," which is adaptable to all purposes (Figure XIII). It is intended primarily for use by a canvasser who inserts names and ages on the front, secures the parents' signatures and notes on the back the time and place of the clinic the children are to attend. If they purpose going to a private physician, his name is entered in lieu of the clinic. The card is indexed by family name and taken to the clinic where the entries are made at the time the injections are given. On completion of the third injection it is transferred to a file for current completed cases where it remains until tabulated, after which it goes to the permanent file for completed cases. Other details are not germane to this discussion and are, therefore, omitted.

FIGURE XIII

NAME OF PARENT OR GUARDIAN.....

Family name	Given name	Age	Address	T-A dates		
				1	2	3

REQUEST FOR INOCULATIONS

(1) I hereby request that my children be inoculated against diphtheria by Dr.....

(Guardian) (Parent)

(2) I hereby request that my children whose names appear above be given the protective injections against diphtheria at a clinic to be held in this community for that purpose.

(Guardian) (Parent)

Dated ..... N. Y., ..... 193.....  
4-17-31-100,000 (17-7069)

The data come to the State Department of Health as simple tables on what is familiarly known as "Form One Forty" (Figure XIV). Only the figures in the first column are used and they are entered on work sheets as received and are tabulated monthly for purposes that need not concern us here. Annually or oftener as occasion requires they are assembled into a table (Figure XV) for each place over 10,000 population and for each county exclusive of such places. This table shows the corresponding figures for the previous years in columns to the left. By drawing a line under the figure for age 4 of the last or current year, under age 3 for the next preceding year, under age 2 for the year before that, and so on, and then by connecting these lines by diagonals, the figures showing the number whose present age is under 5 become apparent and are easily added together. A similar line starting under age 9 will indicate the figure for the 5-9 group. By consulting the "Form One Forty" reports and noting the months covered by them refinement is possible. It is used in special cases, as for example, in Figures II to XII illustrating the experiences of cities in New York State. It is unnecessary to go into details for after all we are dealing with approximations and refinement is rarely justified.

It is now proper to rationalize the hypothesis, to offer an explanation of how it is possible by immunizing a fraction of the population to decrease materially the incidence of such a disease as diphtheria. It seems to be generally accepted that all that active immunization does is to prevent the development of an *attack* of clinical diphtheria; that

FIGURE XIV

Form C. D. 140. 4-17-31-10,000 (17-7070)

NEW YORK STATE DEPARTMENT OF HEALTH  
DIVISION OF COMMUNICABLE DISEASES

SUMMARY BY AGES OF TOXIN-ANTITOXIN IMMUNIZATIONS AND SUBSEQUENT SCHICK TESTS

Town.....  
Village.....  
City.....  
Co..... Month of..... Year.....  
Physician in charge.....  
Name of school or institution.....  
Total enrollment..... Enrollment under 10 years of age.....

AGE IN YEARS	TOXIN-ANTITOXIN INJECTIONS			SCHICK TEST AFTER TOXIN-ANTITOXIN		
	Number of Children receiving			Number tested	Number positive	Number negative
	3 doses	2 doses only	1 dose only			
Under 1						
1 year						
2						
3						
4						
5						
6						
7						
8						
9						
10-14						
15-19						
20 and over						
Total						

REMARKS (Note unusual reactions or any other items of interest)

it does not prevent the individual from becoming a carrier. It is by no means certain that this is so, the little evidence we have on the point being equivocal. The subject is one for further study.

A reduction in the carrier rate, however, even if it occurs, is probably a relatively minor factor. It may operate to keep the rate below the threshold of epidemicity as suggested by Glover<sup>1</sup> for meningitis but it seems to me more probable that the carrier plays a relatively beneficent rôle as the cheapest source of naturally acquired immunity.

As Doull and Lara<sup>6</sup> have shown, the incidence of secondary cases in families with reported clinical cases of diphtheria is at least 10 times and is probably more than 15 times as high as in families with carriers. As compared with families in which carriers were not known to exist, they concluded that families of carriers incurred a small but distinctly greater risk.

The secondary carrier rate in these carrier families and the Schick reactions of the contacts before, after and during the period of exposure are not given. We know from Frost<sup>7</sup> that about 47 carriers develop for every case that develops from the casual exposures of school children while only 6 carriers develop for every case that develops from exposure to known cases. *In other words, carriers tend to develop carriers and presumably immunity, while cases have a much greater tendency to develop new cases.* These observations pointing to the innocuousness of the individual carrier as compared with the individual case do not, of course, rule out the carrier as the principal source of recognized diphtheria. The Baltimore studies indicate that only about 23 per cent of the recognized cases can be traced to a previous case, the inference being that the remaining 77 per cent are due to contact with carriers. Though a large city is not the best place in which

FIGURE XV  
Utica, 1925-1930  
Persons having received three doses of toxin-antitoxin, by age

Age at time given 3 doses	Year in which given three doses					
	1925	1926	1927	1928	1929	1930
All ages	2941	4943	6313	1470	663	4526
Under 1 year	—	115	272	206	224	474
1	—	64	283	127	135	285
2	1	244	472	77	88	274
3	7	240	513	60	64	248
4	32	240	480	76	53	260
5	201	412	707	98	47	476
6	291	427	654	74	32	572
7	365	484	539	73	5	564
8	368	496	445	51	10	470
9	379	474	384	18	4	380
10 and over	1,297	1,443	1,450	32	1	523
Unstated	—	301	114	578	—	—
1931 population under 5 years = 7,708						
Graduated as of January 1, 1931						20,856
All ages						
2,132	Under 1 year					474
7,708	1					509
	2					615
	3					735
	4					799
	Under 5 years					3,132
	5-9					7,056
	10 and over					9,672
	Unstated					996

to attempt this sort of a determination yet, as far as *sporadic* and *endemic* cases are concerned it seems logical that the vast majority are due to carriers.

It does not follow, however, that the cases occurring during a period of high prevalence are mainly due to carriers and I can see no reason for the apparent results from immunizing a minor fraction of the child population if this be true. It would seem that the result must come from the prevention of cases. As the known cases cannot be held responsible for the spread of the disease, it follows that the great majority of these cases are not recognized as diphtheria. They are probably then atypical, the so-called larval cases, the cases that are not seen by a physician, that are missed unless an assiduous search is made for them. As the immunization of a small fraction of the under 5 age group seems to produce a more marked effect than a larger fraction of older children, it seems likely these cases exist in greatest numbers in this youngest group.

One of the rarest types of diphtheria reported to health departments is nasal diphtheria. I refer particularly to the type in which the infection is limited to the anterior nares. This condition is usually extremely mild and yet is said to be very common among infants and younger children. If in taking routine cultures they are found to harbor diphtheria bacilli they probably are classed as "carriers" though there is little doubt that the discharge is due to an underlying pathology due to the diphtheria bacillus. I have some evidence that these cases do not occur in children with antitoxin immunity. These cases are especially dangerous because—(1) they rarely suffer from toxemia and hence move about freely, and (2) the infectious discharge is on the surface where it is readily available. It is perhaps the prevention of a considerable number of such cases that stops an epidemic.

#### SUMMARY

1. The injection of 50–70 per cent of children over 5 years old with 3 doses of toxin-antitoxin has failed in numerous instances to produce any marked effect on the diphtheria incidence of a community.

2. The immunization of 30 per cent or more of children of the under 5 age group in addition to more than 50 per cent of children 5–9 has in several instances produced an immediate and striking decline in the diphtheria rate of the community as a whole.

3. The promptness of this seeming response suggests that a high degree of immunity is quickly acquired by a majority of those given 3 doses of toxin-antitoxin. It is a matter probably of a few weeks rather than several months. The point is worthy of further investigation.<sup>8</sup>

4. In only 2 instances known to the writer has a community that had attained 30 per cent immunization of its under 5 age group suffered even a moderate epidemic.

5. It is possible that immunization of the under 5 age group should not be uniformly distributed through the community, but should be largely concentrated in sections of highest prevalence if diphtheria is prevalent; if not, then in the congested areas.

6. This study is presented as a working hypothesis, worthy of trial as a means of quickly ridding a community of epidemic diphtheria. Much more data from more varied sources are necessary to establish its validity. To this end uniformity in the tabulation of immunization statistics is a necessity. The Committee on Administrative Practice and all health departments should adopt the standard age grouping in their tables, should classify immunizations by single years of age up to 10 years and should annually or oftener so tabulate their material as to show the present status.

7. It is suggested that the unrecognized case rather than the healthy carrier is responsible for the occult infections occurring during epidemics or periods of high prevalence. It seems not improbable that many mild nasal cases would be discovered if diligently sought. Such cases are the ones most likely to spread infection.

Finally it should be clearly understood that this presentment is in no sense a plea for any community to stop work when it has attained a 30 per cent immunity. That figure may be much too low. Active immunization, like antitoxin, was introduced on a wholesale scale during a period when diphtheria was receding from a period of high epidemicity. It is, therefore, the more difficult to measure its effect. The immunity conferred may not suffice for an organism of greater invasiveness, virulence, and pathogenicity.

In any event, the only reasonably sure protection for the individual is individual immunization. The one unvaccinated individual in the city may be the gas station man who serves an itinerant smallpox case. The one infected mosquito may bite a susceptible.

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# Numbers of Bacteria in Frozen Food Stored at Several Temperatures\*

PROFESSOR SAMUEL C. PRESCOTT, F. A. P. H. A.

*Department of Biology and Public Health, Massachusetts Institute of Technology, Cambridge, Mass.*

PHILIP K. BATES, PH. D., AND MATTHEW E. HIGHLANDS

*Bacteriological Laboratory, Frigidaire Corporation, Dayton, O.*

THE introduction of new methods commonly known as quick freezing has given a decided impetus to preservation of food by storing in a chilled or frozen condition. The early development of the process was carried out for the preservation of fish but it has been modified for meats and more recently for vegetables and fruit. In addition to the introduction of quick frozen natural products, many varieties of berries and fruits have been packed in sugar and frozen. This product was developed to provide uncooked fruit for ice cream manufacturers and is extensively used in bakeries and for other manufacturing processes.

While much progress has been made in the experimental development of preservation by freezing, and recent merchandising experiments have shown that the products are well received by the public, there is every indication that still wider application will lead to new products and to tremendously larger sales in the fields already explored.

The general practice is to freeze the product at or near the point of production and then store it, as opposed to the former procedure of storing food in a warehouse and then freezing. In general, the newer products are carefully packaged and are ready to be sold by the retailer without any further preparation. Many have been sold in a frozen condition although some are thawed of necessity, facilities for maintenance in a frozen condition being lacking, and some are thawed to make them more acceptable to the customer. The temperatures for freezing and storage are, in general, considerably lower than those formerly employed.

The products are so new that no markedly different household

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procedures for handling have come into use; they are being treated in approximately the same manner as though fresh. This has, in general, been satisfactory.

The exact character of the changes in food products during the stages of preparation, freezing, storage, and transportation, have not been well established. Criteria of fitness have not been widely published, but it is obvious that control of the manufacturing and merchandising of these products requires definite standards in the interests of public health. Before these can be set a large volume of information is needed concerning the natural changes which take place under carefully controlled conditions.

#### EXPERIMENTAL PROCEDURE

In an attempt to secure general and specific information on the matter, it was determined to obtain samples of commercially frozen food, wherever possible, and expose them to conditions that would simulate the expected retail storage conditions. By observation over a long period, it was believed that changes would be measurable, and that by correlation of these, some standards for satisfactory storage could be set up.

This paper is a preliminary report and includes data on 6 articles: haddock, lamb chops, spinach, strawberries, raspberries, and orange juice, selected as representing the classes of foods most often treated by this process. With the exception of the orange juice, all samples were quick frozen by the Birdseye process, and were received in the laboratory in a condition similar to that which would be expected if they were being removed from the storeroom for distribution to the retail dealer. Although some were freshly frozen, all had been kept at very low storage temperature, probably  $-29^{\circ}$  C. ( $-20.2^{\circ}$  F.). The samples of orange juice came from two plants that were freezing the juice commercially, and were shipped with dry ice refrigeration.

On receipt in the laboratory, samples were divided and stored in Frigidaire cabinets at temperatures of approximately  $-18^{\circ}$  C. ( $0.4^{\circ}$  F.);  $-12^{\circ}$  C. ( $10.4^{\circ}$  F.);  $-6.6^{\circ}$  C. ( $20^{\circ}$  F.).

Examinations were in general made at intervals of 1 week at the start, which were lengthened to 2 or 4 weeks as the test progressed. The bacterial examinations were made by cutting aseptically a piece of approximately 5 gm. This was weighed in a sterile mortar, ground with sterile sand, and the whole transferred to a dilution bottle. Dilutions and plating were carried out in the usual manner. Difco nutrient agar was used. The plates were incubated at  $25^{\circ}$  C., and in some cases duplicates at  $37^{\circ}$  C.

## DISCUSSION

The bacteriological examination was on successive samples rather than successive tests on the same sample. As they were all commercial or semi-commercial it would be expected that they might vary in the number of bacteria, and therefore the numbers recorded on the various examinations might be expected to fluctuate. In products that showed wide variations in numbers before freezing, such fluctuations would be particularly noticeable. The order of magnitude is therefore of more significance than the actual counts. A brief statement of the trend of bacterial numbers for each food will perhaps be most useful in presenting the facts.

*Lamb Chops*—The numbers of bacteria present in lamb chop fat (Table I) were not particularly high in any case. In general, a reduction at all storage temperatures is shown. At  $-6.6^{\circ}\text{C}$ . there is an indication of an increase through the 2d week followed by a decrease. At  $-12^{\circ}\text{C}$ . a similar condition occurred with a peak at the 4th week, though it is difficult to know whether this is a true peak or an erratic high count. At  $-18^{\circ}\text{C}$ . the counts are very irregular and it is not easy to draw any conclusion except that the temperatures may have held the numbers so nearly constant that they reflect the original bacterial content more truly than do the higher temperatures. No counts were made on the lean portion of the chops.

TABLE I

BACTERIA IN THE FAT OF QUICK FROZEN LAMB CHOPS AT 3 STORAGE TEMPERATURES

*Numbers of bacteria per gm.*

Storage Time	$-6.6^{\circ}\text{C}$ .	$-12^{\circ}\text{C}$ .	$-18^{\circ}\text{C}$ .
Start	107,000	107,000	107,000
1 week	359,000	41,200	169,000
2 "	472,000	222,000	89,200
4 "	101,000	346,000	145,000
6 "	38,300	44,400	67,700
8 "	69,100	61,200	26,400
10 "	14,000	46,300	46,100
12 "	3,950	56,500	191,000

*Strawberries*—The numbers of bacteria in the strawberries (Table II) were quite low for the most part. There were noticeable reductions at  $-6.6^{\circ}\text{C}$ . and  $-12^{\circ}\text{C}$ . There are indications that the reduction was more marked and quicker at the higher temperatures. There was little change at  $-18^{\circ}\text{C}$ . A possible cause of this apparent anomaly will be discussed later.

TABLE II  
BACTERIA IN QUICK FROZEN STRAWBERRIES AT 3 STORAGE TEMPERATURES  
*Numbers of bacteria per gm.*

Storage Time	-6.6° C.	-12° C.	-18° C.
Start	1,900	1,900	1,900
1 week	2,000	2,180	2,520
2 "	700	1,400	2,670
4 "	400	680	830
6 "	280	960	2,200
8 "	700	750	1,000
10 "	—	503	2,000
12 "	183	—	1,780

*Raspberries*—Table III indicates that most of the findings noted for strawberries hold for raspberries, except that in a few instances considerably higher counts were obtained.

TABLE III  
BACTERIA IN QUICK FROZEN RASPBERRIES AT 3 STORAGE TEMPERATURES  
*Numbers of bacteria per gm.*

Storage Time	-6.6° C.	-12° C.	-18° C.
Start	50,500	50,500	50,500
1 week	29,200	984	10,800
2 "	1,170	739	3,830
4 "	—	523	313
6 "	275	638	1,520
8 "	726	4,720	1,220
10 "	104	631	1,380
12 "	9,770	709	786

*Spinach*—The counts for spinach (Table IV) were in general somewhat higher than for strawberries and raspberries. The numbers at -6.6° C. include several counts that were noticeably higher than at either of the lower temperatures. Counts at -12° C. and -18° C. were fairly uniform and probably indicate there was very little change in numbers.

*Haddock*—The counts on frozen haddock (Table V) were in general more uniform. The incubation temperature was 37° C. as contrasted with 25° C. for all the other foods. Later work has shown that this temperature is not satisfactory and probably explains the low initial count, as the fish had been kept at extremely low temperatures with dry ice for a number of hours during shipment.

TABLE IV

BACTERIA IN QUICK FROZEN SPINACH AT 3 STORAGE TEMPERATURES  
*Numbers of bacteria per gm.*

Storage Time	-6.6° C.	-12° C.	-18° C.
Start	2,170	2,170	2,170
1 week	5,430	1,100	2,920
2 "	4,110	3,310	1,200
4 "	11,700	4,330	2,590
6 "	1,190	1,350	1,350
8 "	4,720	1,530	6,530
10 "	11,400	1,700	—
12 "	1,190	1,040	2,980

Disregarding some irregular high counts the numbers in the  $-4^{\circ}$  C. samples were low. The numbers in the  $-6.6^{\circ}$  C. samples apparently show a continuous reduction. At  $-12^{\circ}$  C. the numbers were never high, and there were indications of a gradual reduction. The counts on the  $-18^{\circ}$  C. samples were too irregular and too scattered to warrant definite conclusions.

*Orange Juice*—The counts on frozen orange juice were somewhat irregular, due, it is believed, to irregular infection during processing and differences in sampling. There were definite indications that constantly higher counts were obtained from samples stored at lower temperatures.

In general, the results obtained did not indicate any continued increase in organisms at the temperatures studied. There were very definite indications that reductions occurred as storage time increased.

TABLE V

BACTERIA IN QUICK FROZEN HADDOCK AT 4 STORAGE TEMPERATURES  
*Numbers of bacteria per gm.*

Storage Time	-4° C.	-6.6° C.	-12° C.	-18° C.
Start	47	47	47	47
1 week	2,136	5,300	830	—
2 "	227	1,600	790	—
3 "	1,400	1,700	710	1,300
4 "	560	972	740	—
7 "	260	820	560	75
9 "	2,670	5,780	523	1,600
13 "	254	176	257	87
17 "	32,100	2,900	4,500	600
21 "	380	42	80	90
25 "	130	76	100	—

TABLE VI  
MICROÖRGANISMS PRESENT IN FROZEN ORANGE JUICE AT 3 STORAGE TEMPERATURES  
*Orange Juice "E"*  
*Number of organisms per c.c.*

Storage Time	-6.6° C.	-12° C.	-18° C.
Start	113	113	113
9 days	323	485	645
19 days	65	141	367
38 days	65	258	154

*Orange Juice "G"*

	-6.6° C.	-12° C.	-18° C.	-29° C.
Start	2,410	2,410	2,410	2,410
12 days	760	740	3,330	—
20 days	1,100	1,090	1,160	1,340
35 days	750	1,110	3,450	—

The noticeably higher numbers of organisms in some of the foods stored at lower temperatures are not easily explained, but may be due to the fact that the particular foods do not furnish satisfactory soils for the organisms, and the lower temperatures delay the germicidal effects.

CONCLUSIONS

From the limited number of experiments it is difficult to formulate conclusions, but there is every indication that frozen food, if carefully prepared and stored, can be merchandised with an adequately low microörganism content. Fluctuations were noted at all storage temperatures studied.

The small numbers of bacteria present and the temporary slight increases noted do not seem sufficient to explain the chemical and physical changes (limited changes in pH, titratable acidity, weep, color, etc.) detected. The general decreases in numbers of bacteria noted make it seem still more unlikely that microörganisms are the sole or even the principal cause of these changes, which probably are enzymatic.

In certain foods the decreases in numbers of bacteria occur more rapidly and to a greater degree at the higher storage temperatures, and this may be due to the lack of the protective action of extreme cold against the unfavorable environment provided the organisms by the foods.

# Bacteriological and Antigenic Analysis of *Shigella Paradysenteriae* Sonne Isolated from 9 Cases\*

HENRY WELCH, PH. D., AND FRIEND LEE MICKLE, F. A. P. H. A.

*Research Biologist and Director, Bureau of Laboratories, Connecticut State  
Department of Health, Hartford, Conn.*

THE importance of *Shigella paradysenteriae* Sonne† as the cause of acute and mild cases of diarrheal disease in this country has been emphasized by the investigations of Nelson<sup>1</sup> and MacKenzie and Batt.<sup>2</sup> As pointed out by Nelson, the association of late-lactose-fermenting organisms of the paradysentery group with diarrheal disease was first noticed by Duval and Schorer<sup>3</sup> in 1904. It was not until 1915 that Sonne<sup>4</sup> demonstrated as the main causative agent of dysentery in Copenhagen a late-lactose-fermenting bacillus which was serologically specific. A review of the literature is given by Nelson.<sup>1</sup>

*S. paradysenteriae* Sonne apparently may produce both extremely severe and mild cases of dysentery. In acute cases there is a sudden onset with epigastric pain, vomiting, diarrhea, and prostration, and death may result. On the other hand, the patient may recover, after a few days to relapse with the same symptoms. The temperature fluctuates between 100° and 104°. The mild cases do not exhibit particularly abnormal symptoms. The temperature rise is not as high, usually 100°–101°; vomiting and epigastric pain do not usually appear but the patient passes a number of loose, watery stools each day. The mild cases last a week or less. The organism can be recovered without difficulty from the patient's stools during the illness.

In this investigation 9 cases are recorded, 7 of which are from a single family exhibiting both mild and severe types of dysentery. One, 263A, was associated with some 150 other boys in a school in another state, all with a diarrheal disease, a number of similar cases occurring simultaneously in the town in which the school is situated. Since no examinations of feces were made, no epidemiological studies could be carried out. The other case occurred in a hospital in Hart-

\* Read before the Laboratory Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 17, 1931.

† Although for convenience the authors use the nomenclature suggested in *Bergey's Manual*, 3d ed., that they do not fully subscribe to his classification of this group of organisms is evident from the context.

ford, and was fatal. The following case reports are included as illustrations of the mild and severe forms of disease encountered.

*Case 1.*<sup>5</sup> B. C., age 4. July 24, 1930, taken suddenly ill with chills and high temperature ( $104^{\circ}$ ). Many loose watery stools streaked with blood. Severe intermittent pains through the abdomen which was tender to pressure without distention or rigidity. After 4 or 5 days, symptoms subsided, temperature came down to normal, and the child felt well. Two weeks later the same sort of illness recurred, with apparent recovery.

This case was typical of the 7 in the family. During August and September all other members of the family came down in turn, frequently 2 at a time. The children were ill more often than the adults.

*Case 2.*<sup>5</sup> R. D., age 16 months, admitted to hospital December 23, 1930. Rectal temperature  $99.4^{\circ}$ . No physical findings of significance. Child appeared well for 7 days; temperature normal. December 30, rectal temperature  $100.2^{\circ}$ , and child somewhat restless. Had several rather loose yellowish stools and was cross and irritable. There was a slight nasal discharge and a slight infrequent cough. The temperature rose rapidly to  $103^{\circ}$  and during the night 7 loose, yellowish evacuations showing no blood occurred. Temperature remained high, and patient died at noon, December 31.

No laboratory examinations were made during acute illness. Previous Wassermann and throat culture had been negative.

Cultures from the tonsillar exudate showed a mixed flora without any pathogenic organisms predominating. Culture from cecum showed *S. paradysenteriae* Sonne predominating organism, a few *Escherichia coli* and fecal streptococci.

A bacteriological and antigenic study has been made of all the cultures isolated since July, 1930, to determine whether they gave consistent reactions in carbohydrate media, to determine differential laboratory tests, and, to study the antigenic relationship of *S. paradysenteriae* Sonne to other members of the paradysentery group.

#### MORPHOLOGICAL CHARACTERISTICS

The isolation of *S. paradysenteriae* Sonne has been fairly simple. One gram of suspected feces was emulsified in 2 to 3 c.c. of isotonic salt solution, and 1 loopful streaked on petri dishes containing suitable media. Both eosin-methylene-blue agar and Endo's medium have been used with equal success. In 24 hours colonies of *S. paradysenteriae* Sonne appeared smooth, greyish white and translucent, 2–3 mm. in diameter, similar to other organisms of the dysentery group in morphology. After 48 hours the following characteristics were noted:

*Eosin-methylene-blue agar*.—Colonies were 0.5 to 3 mm. in diameter, convex and translucent, with crenated edges in the majority. Some cultures had a tendency to produce a slight pale blue center, and some a fecal odor.

*Endo's medium*.—Colonies were smooth, glistening, translucent, raised, with en-



tire edge, in size from 0.5 to 3.5 mm. No fecal odor noted. Crenated edge not observed. The colonies had a bluish tint in direct light, with tendency to develop pale pink centers.

*Agar plates*—Colonies varied from pin points to 4 mm.; with definite crenated edge; white, translucent and raised, with a pale blue tinge in direct light. A fecal odor was present in some cases.

*Agar stroke*—On agar slants the growth was echinulate, glistening, butyrous, raised, translucent, slightly granular under hand lens. The odor was not consistent but fecal when present. Figure I shows the type of growth on eosin-methylene-blue (A), Endo's medium (B), and agar (C).

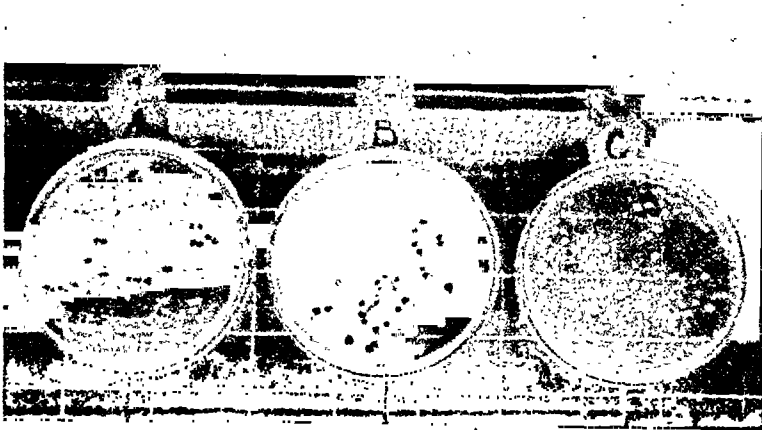


FIGURE I—*Shigella Paradyenteriae* Sonne on Eosin Methylene Blue, Endo and Agar Media

On microscopic examination the organism appeared as a Gram-negative, short, coliform bacillus with involution forms, the latter 5 or 6 times longer than the short bacilli which predominated.

#### PHYSIOLOGICAL CHARACTERISTICS

A comparison of fermentative ability was made between the cultures isolated and "*Metadysenteroides*" 4086, *S. paradyenteriae* Sonne 31, and *S. dispar* 29, of the American Type Collection. A series of carbohydrates including dextrose, lactose, sucrose, maltose, levulose, mannite, raffinose, salicin, galactose, sorbite, inulin, xylose, arabinose, adonite, inosite and rhamnose was inoculated and readings made daily for 21 days. Andrade's indicator was used in all carbohydrates. The methyl red, Voges-Proskauer, indol and Koser's citrate tests were made. The results are shown in Table I. It will be noted that dextrose, levulose, mannite, galactose, arabinose and rhamnose were fermented within 24 hours, whereas lactose, sucrose, maltose and raffinose were fermented late in the majority of cases. Sucrose seemed the carbohydrate which resisted fermentation longest.

More than one culture was isolated from most patients and these were inoculated into the carbohydrates in duplicate. Although the

TABLE I  
FERMENTATIVE REACTIONS OF PARADYSENTERY ORGANISMS

Culture Number	Dextrose	Lactose	Sucrose	Maltose	Levulose	Mannite	Raffinose	Salicin	Galactose	Sorbito	Inulin	Xylose	Arabinose	Adonite	Inosite	Rhamnose	Koser's Citrate	Indol	Methyl Red	Voges Proskauer	Motility	Gram Stain
Metadysenteroides *	A <sup>1</sup> †	A <sup>1</sup>	A <sup>4</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>4</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
Metadysenteroides	A <sup>1</sup>	A <sup>1</sup>	A <sup>6</sup>	A <sup>7</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>6</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
Sonne 31 *	A <sup>1</sup>	A <sup>6</sup>	A <sup>6</sup>	A <sup>3</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>2</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
Sonne 31	A <sup>1</sup>	A <sup>2</sup>	A <sup>2</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>2</sup>	—	A <sup>1</sup>	A <sup>1</sup>	—	A <sup>1</sup>	A <sup>1</sup>	—	—	A <sup>1</sup>	—	+	±	—	—	—
Dispar 29 *	A <sup>1</sup>	A <sup>2</sup>	A <sup>2</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>6</sup>	—	A <sup>1</sup>	A <sup>1</sup>	—	A <sup>1</sup>	A <sup>1</sup>	—	—	A <sup>1</sup>	—	+	±	—	—	—
Dispar 29	A <sup>1</sup>	A <sup>2</sup>	A <sup>2</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>6</sup>	—	A <sup>1</sup>	A <sup>1</sup>	—	A <sup>1</sup>	A <sup>1</sup>	—	—	A <sup>1</sup>	—	+	±	—	—	—
416A	A <sup>1</sup>	A <sup>2</sup>	A <sup>6</sup>	A <sup>2</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>3</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
416B	A <sup>1</sup>	A <sup>1</sup>	A <sup>2</sup>	A <sup>2</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>4</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
417A	A <sup>1</sup>	A <sup>1</sup>	A <sup>2</sup>	A <sup>2</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>3</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
417B	A <sup>1</sup>	A <sup>7</sup>	A <sup>9</sup>	A <sup>5</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>6</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
459A	A <sup>1</sup>	A <sup>1</sup>	A <sup>7</sup>	A <sup>2</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>4</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
459B	A <sup>1</sup>	A <sup>1</sup>	A <sup>9</sup>	A <sup>4</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>7</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
1610A	A <sup>1</sup>	A <sup>5</sup>	A <sup>15</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>9</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
1610B	A <sup>1</sup>	A <sup>2</sup>	A <sup>5</sup>	A <sup>3</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>8</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
263A	A <sup>1</sup>	A <sup>1</sup>	A <sup>5</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
263B	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>6</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
451	A <sup>1</sup>	A <sup>7</sup>	A <sup>17</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>4</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
413	A <sup>1</sup>	A <sup>7</sup>	A <sup>12</sup>	A <sup>4</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>4</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
562A	A <sup>1</sup>	A <sup>1</sup>	A <sup>15</sup>	A <sup>4</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>6</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
562B	A <sup>1</sup>	A <sup>1</sup>	A <sup>9</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>5</sup>	—	A <sup>1</sup>	—	—	—	A <sup>1</sup>	—	—	A <sup>1</sup>	—	—	—	—	—	—
165A †	A <sup>1</sup>	?	?	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	?	—	A <sup>1</sup>	A <sup>2</sup>	—	A <sup>2</sup>	A <sup>1</sup>	—	—	A <sup>2</sup>	—	+	±	—	—	—
165B	A <sup>1</sup>	?	?	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	?	—	A <sup>1</sup>	A <sup>1</sup>	—	A <sup>1</sup>	A <sup>1</sup>	—	—	A <sup>2</sup>	—	+	±	—	—	—

\* Cultures obtained from the American Type Culture Collection.

† Exponent designates number of days necessary to produce acid.

‡ Not classified.

final readings were the same, the time varied. For example, cultures 417A and 417B, isolated on different days from the same patient. Culture 417A showed formation of acid in lactose in 1 day and sucrose in 2 days, whereas 417B required 7 and 9 days respectively. These apparent discrepancies, noticeable throughout the investigation, emphasize the necessity of long incubation of these organisms in carbohydrate media.

An examination of duplicate cultures of "*Metadysenteroides*" and of *S. paradysenteriae* Sonne (Table I) indicates that their fermentation reactions are identical, whereas *S. dispar* has different reactions, the latter showing fermentation of sorbito and xylose and producing indol. The fermentative reactions indicate that "*Metadysenteroides*" and *S. paradysenteriae* Sonne are identical organisms, whereas *S. dispar* is quite different. Continued transplantations of the above cultures demonstrated the consistency of these fermentative reactions.

Cultures 165A and 165B were isolated from a case in a family from other members of which typical *S. paradysenteriae* Sonne had previously been isolated. It will be noted (Table I) that their reactions coincide in general with those of *S. dispar*. However, the amount of acid produced in lactose, sucrose, and raffinose was very small, and 20 daily transfers in those 3 sugars failed to increase the acid production. They were found to be serologically different from *S. dispar* (note Table II).

TABLE II

SEROLOGICAL RELATIONSHIP OF CULTURES ISOLATED. PARADYSENTERIAE SONNE, DISPAR AND "METADYSENTEROIDES" (AMERICAN TYPE COLLECTION) ARE INCLUDED

Culture Number	Antiserums (Titer)					
	Sonne (Prepared)	"Meta-dysenteroides" (Prepared)	Dispar (Prepared)	Sonne Secured from "Nelson"	Flexner (Commercial)	Shiga (Commercial)
Sonne 31	2,560 *	2,560	0	2,560 *	0	0
Metadysenteroides 4086	2,560	2,560 *	0	2,560	0	0
Dispar 29	0	0	1,600 *	0	400	0
416A	2,560	1,280	0	2,560	0	0
417A	2,560	1,280	0	1,280	0	0
450A	2,560	2,560	0	2,560	20?	0
1640A	1,280	2,560	0	2,560	0	0
263A	1,280	2,560	0	2,560	20?	0
451	2,560	2,560	0	1,280	0	0
413	1,280	2,560	0	1,280	0	0
562A	1,280	1,280	0	2,560	20?	0
165A	0	0	0	0	0	0

\* Homologous antiserums.

NOTE: Figures represent greatest dilution in which complete agglutination appears.

#### SEROLOGICAL CHARACTERISTICS

Antiserums were prepared with 3 organisms obtained from the American Type Collection, *S. paradysenteriae* Sonne 31, *S. dispar* 29, and "*Metadysenteroides*" 4086, by inoculating rabbits every other day over a period of 20 days with increasing doses of heat killed organisms. Some difficulty encountered with culture 31, was overcome by the use of minute doses of living organisms. The animals, after 24 hours' fasting, were bled from the heart when a titer of approximately 2,500 had been reached.

Agglutination tests were made using the various cultures isolated and those from the American Type Collection. The results are given in Table II. Antigens for all agglutinations were prepared to correspond to a turbidity of 7.6 to 7.8 with the Gates' apparatus. Titers

varying from 1,280 to 2,560 were obtained with all the cultures used except 29 and 165A; the former, *S. dispar*, and the latter a culture isolated from a case of diarrheal disease in a family from which a number of cultures of *S. paradysenteriae* Sonne had been isolated (note 417A and 451).

The cross agglutination between *S. paradysenteriae* Sonne 31 and "*Metadysenteroides*" 4086 would indicate that they are identical. This is corroborated by the reactions of the antisera of these organisms with the cultures isolated in our laboratories.

A Sonne antiserum (Sonne Nelson, Table II) obtained through the courtesy of Dr. R. L. Nelson, of the Infants Hospital, Boston, showed reactions practically identical with those obtained with the Sonne and "*Metadysenteroides*" antisera prepared in our laboratories.

Agglutinations were obtained with antisera prepared with *S. dispar*, with its homologous antigen 1:1,600 and with a strain of *S. paradysenteriae* Flexner 1:150. It was found that a Flexner antiserum (Lederle) was capable of producing agglutination as high as the 1:400 dilution with a culture of *S. dispar* in comparison to 1:1,600 with its homologous antigen. No cross agglutination occurred with Shiga antiserum.

In order to study further the agglutination of *S. dispar* by Flexner antiserum, it was absorbed with Flexner organisms. The absorbed antiserum produced no agglutination with Flexner organisms but continued to give an agglutination of undiminished titer (1:400) with *S. dispar*. The absorption of *dispar* antiserum with its homologous organism produced different results in that no agglutination was obtained with either a *dispar* or a Flexner strain. On absorbing the antiserum with heterologous organisms the *dispar* strain was capable of partially absorbing Flexner agglutinins from the Flexner antiserum although our Flexner strain was incapable of absorbing *dispar* agglutinins from a *dispar* antiserum (Table III).

It was expected on absorbing Flexner antiserum with a Flexner antigen that because of their apparent cross relationship (note column one, Table III) the absorption would deplete materially the titer of the group or heterologous agglutinins, but although all the Flexner agglutinins were absorbed, the titer remained unchanged with the *dispar* strain.

The Flexner antiserum was prepared with 4 strains: (1) Flexner Harris, Rockefeller Institute; (2) Strong, Army Medical Museum; (3) Hiss Y., Army Medical Museum; (4) Flexner, Army Medical Museum. (Personal communication from the manufacturer.)

Since absorption of this antiserum with our single Flexner strain

TABLE III

SEROLOGICAL RELATIONSHIP OF *S. Paradysenteriae* FLEXNER TO *S. Dispar*  
(AMERICAN TYPE COLLECTION)

Organism	Antiserums					
	Flexner	Dispar	Flexner absorbed with Flexner	Flexner absorbed with Dispar	Dispar absorbed with Dispar	Dispar absorbed with Flexner
Flexner	1,600 *	150	0	800	0	0
Dispar	400	1,600	400	0	0	1,600

\* Figures represent complete agglutination.

NOTE: The Flexner antiserum was obtained from Lederle. The dispar antiserum was prepared in our Laboratories with a strain obtained from the American Type Collection.

did not deplete the dispar agglutinins (Table III) the evidence indicated that one or more of the strains used by the manufacturer were multiple antigens, with respect to dispar; i.e., had the ability to produce agglutinins for dispar as well as Flexner. Further, our stock Flexner strain used for absorption is apparently a pure antigenic strain with respect to dispar since it was not able to deplete the dispar agglutinins in the Flexner antiserum although absorbing completely its homologous agglutinins. This is corroborated by absorbing a dispar antiserum with our stock Flexner strain. In this case (Table III) all the Flexner agglutinins were removed whereas the dispar titer remained the same. Since our dispar serum (prepared with *S. dispar*, American Type Collection, showed cross agglutination with our stock Flexner strain, and the dispar organism is capable of depleting Flexner agglutinins in the Flexner serum the evidence indicates that this organism contains a multiple antigen for Flexner. This is corroborated by absorption of dispar serum with its homologous antigen since in this case the agglutinins for both Flexner and dispar were completely removed. The multiplicity of antigen in the Flexner-dispar series is being investigated further.

#### DISCUSSION

Relatively little work has been done in this country on *S. paradysenteriae* Sonne. However, the recent work of Nelson<sup>1</sup> indicated its importance as a cause of diarrheal disease in Boston, and it is the purpose of this investigation to emphasize further that this organism has greater significance as a cause of dysentery than has been suspected. Since mild forms of the disease characterized by diarrhea, headache, and slight abdominal pain with little fever clear up quickly,

it may be that a large majority of cases of diarrheal disease are due to this organism.

We found the laboratory diagnosis comparatively simple. The colonies of *S. paradysenteriae* Sonne are striking on differential media such as eosin-methylene-blue or Endo's medium, and the growth is vigorous on the more common media. The fermentative reactions were consistent and although the time required for a given carbohydrate to be acted upon varied, the end results were identical.

Separation of the Sonne and dispar strains is readily accomplished by their fermentative and serological reactions. No serological relationship was shown between our Flexner and Shiga strains and *S. paradysenteriae* Sonne although a distinct cross agglutination of a Flexner strain and *S. dispar* was demonstrated.

Our results corroborate those of Nelson<sup>1</sup> in that *S. paradysenteriae* Sonne 31, and "*Metadysenteroides*" 4086 described by Castellani, appear to be identical in fermentative and serological reactions whereas *S. dispar* (Andrewes) gave distinctly different reactions.

Cultures 165A and 165B (Table I) have remained unclassified. Although giving reactions consistent with *S. dispar* no serological relationship could be demonstrated. Further work is being done on this organism.

#### SUMMARY

1. Nine cases of diarrheal disease caused by *S. paradysenteriae* Sonne are reported.
2. A detailed, morphological, physiological and serological study is presented.
3. The American Type Collection Cultures *S. paradysenteriae* Sonne 31 and *Metadysenteroides* 4086 appear to be identical in their fermentative and serological reactions.
4. *S. dispar* 29 appears to be distinct from *S. paradysenteriae* Sonne in its serological and fermentative characteristics.
5. A serological relationship between *S. paradysenteriae* Flexner and *S. dispar* is demonstrated by direct agglutination and by agglutinin absorption.
6. Further emphasis is placed on the significance of *S. paradysenteriae* Sonne as a cause of diarrheal disease in this country.

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# Health Facts—What to Tell\*

DONALD B. ARMSTRONG, M. D., Sc. D., F. A. P. H. A.

*Third Vice-President, Metropolitan Life Insurance Company, New York, N. Y.*

WHAT to tell—not how to tell it—that is the question. Of course, in the final analysis, what to tell depends in part on whether or not it can actually be made intelligible to the man in the street. Consequently, even from our angle, we cannot altogether ignore the question of application.

In appraising so-called health facts, we want to be certain that they are true and that they are important. But truth is relative, particularly in point of time. What is true for one generation is not true for the next. The evolution of “factuality” is like the evolution of morality. Both are always in transition. That is perhaps why facts, like moral values, are not often pure white or jet black but, to paraphrase the “Old Fra,” usually a rather slaty gray. That is perhaps why in public health as in other movements, it is often easily possible to give an aura of reality to what is mostly fiction.

## VARIETIES OF HEALTH “FACTS”

Yet in the field of health and disease, there are always a few things about which we are quite certain, even though the professor of medicine is accustomed to initiate his first series of lectures with the warning that, in medicine, there are two words rarely applicable; namely, “never” and “always.” In any event, it is certainly true that a consensus of scientific opinion, approaching the data used in health education on a factual basis, would be willing to throw most of the items, legitimately or erroneously used as facts, into several groups:

1. Items in health practice that, certainly for our times and as far as we can see for the future, are scientifically certified facts.

2. Items whose probability is large, but where we are not quite certain of our facts. This group may include items that a previous generation accepted without question, but which we now may be unlearning, so to speak. It may also include a group of near facts that increasing experience seems to make more and more probable, but about which we as yet have no final proof.

3. Items extensively used as facts, especially for commercial exploitation, but

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which we know either to be erroneous, or at least employed with misleading and perverting aims.

As the field of admitted scientific factual data enlarges and progresses, it acquires in advance of it new facts, as theories and hypotheses are underwritten by investigative verification. In its trail, it sheds once accepted facts into a region of doubt, and may be said always to be acquiring new fallacies for old.

#### NEW FALLACIES FOR OLD

We once, many years ago, wrote an article on the subject of health fallacies, in which attention was paid to "disease germs that lurk in dark and damp places," the alleged dangers of sewer gas, and the excessive proportion of health department budgets that was then spent for plumbing inspection. We also touched upon the exaggerated importance of housing equipment over the more significant items of living methods. In the intervening years, these fallacies have entirely receded into the periphery of doubt and darkness, and no longer require destructive attention. In fact, we may now more usefully attack certain more recently suspected fallacies, such as "the clean tooth never decays," or the myth about underweight as a guide to the detection of tuberculosis in school children. The fallacy of this much respected theory has been brought out very effectively by the work at the Phipps Institute in Philadelphia on tuberculosis among school children. It has perhaps been even more dramatically emphasized in the study of 1,000 supposedly normal adolescent children in the schools in the Bellevue-Yorkville District of New York City. You will remember that of 1,000 children carefully examined with the X-ray, tuberculin test, and the fluoroscope, 184 were placed in what was known as the tuberculous group—not active tuberculosis alone, of course, but latent or grave quiescent lesions, or arrested conditions requiring continued observation and hygienic care. Now, it is significant that among these 1,000 children, there were 128 who were 10 per cent or more underweight, but only 18 of the 184 tuberculous children were in this group of 128. In fact, more tuberculosis was found among the overweight children than among the underweight. Consequently, an alleged health fact tremendously exploited throughout the schools of the world, becomes very nearly, if not quite, a health fallacy.

It is our obligation to discuss health facts rather than health fallacies. Nevertheless, we cannot resist the temptation to cite one additional widely advertised "health fact" that seems in part to be fallacious: the often cited, ever increasing tide of the so-called principal cause of death, namely, heart disease. Is this a reality? Certainly,



the general death rate for all forms of heart disease at all ages has been steadily increasing. Two years ago, for the first time in several years, there was a break in this upward curve, perhaps only temporary, yet worth watching. On the other hand, we must realize that this heart disease picture is made up of 3 principal elements.

First, it includes children and young adults under 45, where deaths from heart disease are a tragedy and a disaster. Perhaps in most cases, the etiological factors here are the acute infections resulting in heart tissue injury. Prevention largely involves the control of these infections. The incidence of these infections, such as diphtheria, scarlet, typhoid, and acute rheumatic fevers, is markedly decreasing, a factor that may be related to another significant observation, the recent very definite decline in heart fatalities at these ages. This, the most important age group sector in the heart disease range, presents a trend that is not only not alarming, but decidedly reassuring and encouraging.

Second, the heart disease picture also includes the age group from 45 to 65 or 70, where deaths from heart disease are certainly unfortunate. It is thought that they result partly from acute infective injuries, but more from syphilis. Prevention means mainly the control of syphilitic infection, and particularly the prevention of the advanced stages of syphilis by detection and adequate treatment. Is it possible materially to affect heart disease mortality in this middle age group by these control measures as well as by personal hygiene, the periodic health examination, or the practice of physiological thrift? That seems probable, so that here too, as well as in the younger age group, the picture is not discouraging.

Third, the heart disease picture includes, of course, the senescent, old-age, degenerative type occurring usually beyond 65 or 70. Deaths from heart disease in this age group are increasing, and are inevitably bound to increase as the population ages, and as larger groups survive to invade this age period. Heart failure is an inevitable incident in this age group. On the other hand, here it certainly is not a tragedy as it is among young adults, nor the unfortunate factor it is in the middle age population element. In fact, it is almost a natural process, and in a great many cases, a benign, beneficent process, furnishing an easy and painless as well as an unprotracted termination of life.

From the point of view of health facts, it is important to distinguish between these 3 elements. To present the general combined death rate from heart disease as an increasing and inevitable menace is obviously misleading and unduly discouraging. The increasing rate is real, but is neither altogether deplorable nor alarming. Furthermore,

it is certainly in part the inevitable and desirable *sequitur* of disease prevention and life prolongation in the earlier age groups. This is a case where analysis and appraisal are essential to the presentation of a true picture for public view, and indeed for constructive, hopeful action.

#### GRADE A FACTS

But let us come to the kernel of our story—to the factors in our health educational program that can today, at least with reasonable confidence, be labelled Grade A facts. Obviously, we cannot attempt to list all of the items that in our opinion could now be classified as Grade A; yet all items employed by health educational agencies in their programs should regularly be scrutinized from this point of view. Here are a few examples of Grade A facts, yet even to these there probably would not be universal acquiescence.

Take the question of diet. There is, of course, a great deal we do not know about nutrition, yet we seem to be quite certain that a balanced ration is of fundamental importance to health. This idea seems to be generously supported both by animal experimentation, and human experience. Dr. Sherman and others have pointed out that apparently for normal life and growth, for disease resistance, and for tissue health, we must have at least a minimum supply of calcium, and possibly other minerals, and of the vitamins, perhaps particularly A, C, and G. Consequently, health education that interprets this point of view of science in practicable and intelligible statements, would seem to be based solidly, for the time being at least, upon health facts.

There seems also to be a high degree of certainty as to the hygienic and therapeutic value of sunlight, within fairly definite limitations. While widely exploited for commercial ends, sunlight, either natural or artificial, seems to be a definite aid to health and strength when properly used. We need here, of course, careful delimitation and definition, but with scientific guidance, there is much that can be said with assurance.

Let us consider communicable disease. There is much that seems to be incontrovertible within the limits of our present knowledge. We have many positive facts concerning the sources and modes of infection. Much has been proved about water and milk supplies as mediums of infection, and about carriers in typhoid fever, diphtheria, and other affections. We can speak with definiteness concerning the importance of protecting infants from contact infection in such diseases as measles and whooping cough. We know that it is important to advocate the washing of hands before eating and after using the toilet. There is much that can be said with assurance to parents con-

cerning the proper care and treatment of, as well as the convalescence from such a disease as measles, not so much to prevent infection, as to prevent complications, serious sequelae, and fatalities. Finally, on the side of prevention, we have very definite facts to offer the public in the field of immunization as applied to diphtheria, smallpox, and typhoid fever, and, with somewhat less positiveness, to measles, scarlet fever, and certain other conditions.

#### FACTS HANDICAPPED BY METHOD

Still in the field of what may be considered Grade A facts, there is a fluctuating volume of health promotive and disease preventive educational items that has, in theory, full scientific support, but whose effective application is handicapped by a serious limitation, or an inherent frailty in method of use; for example, the movement for early disease detection. Much is being said to the public about early diagnosis, and to the medical profession about so-called pre-clinical medicine. The slogan is "Find disease early," and to some extent this is a sound objective. Certainly many affections can be diagnosed, treated, and arrested or cured at a much earlier stage than the usual course of events permits. Examples of this are an incipient tuberculosis, a localized cancerous growth, an early pancreatic, or cardiac, or nephritic affection.

The medium advocated is the periodic health examination—a medium sound in theory, but as yet very frail in practice. The public is not yet educated to go to the doctor early enough; the doctor not yet sufficiently interested or informed or equipped to carry out the requisite examination and tests; and few communities have the necessary machinery to guide the individual to legitimate private or publicly organized sources of such service. Hence, the machinery for applying perfectly good health facts is, in this instance, very defective, and still constitutes a serious handicap upon what is theoretically a perfectly reasonable program.

Of course, the periodic health examination movement comes in for considerable criticism, not only from the lay public on the grounds of inadequate execution, but also from the professional side. It has been claimed by prominent authorities that the possibilities of early disease detection have been grossly exaggerated, which may to some extent be true. Undoubtedly, here our health facts are not quite so absolute as we should like to have them. It is also claimed that this health examination movement has certain very distinct psychological disadvantages; that it places too much emphasis upon physical welfare and physical symptoms; that it excites too much curiosity, fright, and in-

tropection; that it causes as much harm through worry as it does good; that it is, in other words, injuriously and often disastrously suggestive.

On which side of this argument does fact lie? It is no doubt true that most of us are open to influence by suggestion, but the principal question seems to be, where shall we get our suggestions? Shall they come to us from a scientific source through the physician on a basis of knowledge and fact, or through quackery, backfence gossip, patent medicine advertisements, and the ignorant imaginings of uninformed minds? It would seem that the former alternative is preferable, and is on the factual side. If that is true, we should teach the public not to be afraid of facts. Facts should furnish a relief from unfounded fears, and afford an opportunity to face genuine dangers intelligently.

In this general health educational movement for early disease detection via the health examination, it is important to be sure as to what diseases are detectable in their incipency, and to what degree—certainties which we do not as yet possess. It is equally important to recognize that in this movement we are very decidedly limited by method, and that our educational program should not step too far in advance of the development of assured technical and clinical procedure. Yet facts there are, and worthy of constructive if conservative use.

Incidentally, it should also be recognized that there are some health facts that are not applicable for general public dissemination. Not all facts are for all people at the same time. While it is highly desirable to reach all mothers with a message on diphtheria immunization, for instance, it is not necessary to tell all mothers, with the same force and authority, about the use of convalescent serum or whole blood for the prevention of measles, or its complications. It may be desirable, in a still more limited way, to be able to instruct a few people in certain of the health facts concerning personal hygiene, not in large groups, but perhaps even individually through the physician or health adviser. Here again, it is not so much the facts that are lacking as the machinery.

There should exist in every community the facilities for individual medical and health guidance. General broadcasts by radio, through literature, the press, advertisements, and all the wholesale devices available, will not serve to answer intimate personal questions on health and disease prevention. The private physician should eventually fit in here most effectively. In the meantime, people are seeking this kind of individual advice, and it is only through the development in communities of facilities for individual medical and health guidance, preferably, to my mind, under the auspices of county medical societies, that this need can be met. Only in this way can our store of health knowledge, whatever its limitations, be utilized to the full.

## THEORY VERSUS PRACTICE

We have cited examples of facts that are applicable in theory, but not always in practice, owing to difficulties of procedure. This aspect of the problem may be illustrated from still another angle. Back in 1904 or 1905, when the first tuberculosis organizations were formed, and when health and medical organizations were just beginning to anticipate the possibilities of the application of bacteriological knowledge of the cause of this disease, health propagandists aroused unusual enthusiasm concerning the early control and eradication of this great cause of sickness and death. About 1908 a slogan was adopted in an eastern state, "No Tuberculosis by 1915." Of course, everyone knew that this probably could not be attained, but it served a valuable purpose by emphasizing the theoretically attainable goal. In 1925, or shortly after, another slogan was adopted: "No Diphtheria by 1930." This was another commendable manifestation of hitching a wagon to a star. Goals, after all, are to be striven for, not always to be attained. "El Dorado lies always over the next hill." Up to the present, this method of featuring a theoretical health fact has had remarkable educational advantages, and has certainly furthered the ultimate attainment of the objective.

We should perhaps, from this point on, be somewhat on our guard with programs of this type. While they have been almost wholly advantageous in the past, may they not present a hazard for the future? Should we not be more cautious in our popularized forecasts? It is true that the public memory is short. It may become enthusiastic about the objective, sympathize with the methods, give generous financial and moral support, and then readily ignore the fact that the goal was after all not reached. Yet is it not possible that if we prod this frail public memory too frequently with repeated reminders of failure, not only through time limit slogans, but also through explosive health campaigns, health weeks, and similar concentrations, where the promise is not and almost always cannot be fulfilled, are we not apt to arouse a disquieting and disillusioning train of recollections in the public—a circumstance that would certainly produce a diminishing return in coöperation, or perhaps even a repudiation of leadership? Of course, the public responds more to slogans than to a scientific statement of probability; so we are handicapped in all of our work in this field by the necessity for simplicity.

It is evidently necessary to be assertive and dogmatic. However, there is some admitted hokum in our health educational program, and the public is in a debunking mood. Let us therefore keep, so far as possible, within the realm of the attainable in our prognoses as to the efficacy of our programs.

## GRADE B—NEAR FACTS

Thus far, except for our earlier discussion of new and old fallacies, and of the general region of doubt which surrounds the factual health field, we have been discussing Grade A facts—things which we think are almost if not certainly true, but which may be seriously limited in their application for the reasons cited. In the health educational field, as we implied in the beginning, there is another, even larger, body of very appealing items—things which we generally believe to be true, which we would very much like to have true, but which, in the majority of instances, we cannot actually prove. One can pick up almost any health publication from any legitimate agency, official or private, and find examples of this type of health statement.

I have before me at present a bulletin of an official department in Washington. It contains a list of rules for health. One is: "Drink at least 4 glasses of water a day." Sometimes this rule reads 6, and sometimes 8 glasses a day. This sounds like good advice, but have you ever attempted to verify it on a basis of scientific experiment, except perhaps for certain pathological conditions, such as a case of nephrolithiasis?

Another bulletin, from a very responsible organization, states that practically everyone needs an average of 8 hours' sleep every night. This we have found somewhat difficult to verify. Then, take fresh air—how frequently have you read and also said that fresh air prevents colds, and "catching" diseases like tuberculosis? What do we really know about colds, for instance, in this connection? Then, exercise—"There is no better way to prolong life." Of course, there is no better way to shorten life for some people, and there are a great many people who live long and happily who take very little if any exercise. It is undoubtedly a good general health rule, but the scientific background for it is extremely vague compared with the fact, for instance, that vaccination prevents smallpox.

Then, cleanliness—"Full bath more than once a week." What health condition will that promote? what disease will it prevent? how will it prolong life? The cold shower—does it prevent colds by "hardening the skin"? Has it really any relationship at all to colds? Certainly, cleanliness is esthetically and socially desirable, and the cold bath is a pleasant, invigorating habit for many people, but how do these compare as facts in contrast to the certainty with which vitamin D will prevent rickets, or to the assurance with which we can guarantee protection against diphtheria with toxin-antitoxin or toxoid? How important is it to "Brush your teeth twice a day" in order to prevent dental caries, as compared with the significance of an adequate supply

of calcium and vitamins A and C in the diet? Presumably, we also have near facts in the immunization and related fields, such as the Calmette vaccine for tuberculosis, the use of convalescent serum in the treatment of poliomyelitis, etc.

Numerous other examples might be cited. Yet it remains that these near facts are appealing, and convincing. In general, we all feel that their promulgation does some good and little if any harm. We feel that most of them are in the right direction though they need verification, and subsequent experience may slightly or extensively modify our views. Here again, of course, we suffer from the necessity of health education being direct, simple, and dogmatic.

#### CURRENT APPRAISAL DESIRABLE

It may not be inappropriate to suggest the advisability of creating in this organization, and in this section, a committee or other piece of machinery for a comprehensive and continuing review of all of the data that we find appealing and apparently useful in health education. This would mean a careful analysis of the multitude of statements that appear with official or other reliable endorsement. It should also include statements that appear through the spurious channels of quackery and through misleading commercial exploitation. Such an appraisal would lead perhaps to a classification that would be subject to appropriate publicity, as well as to periodic revision. The objective of such a program would be the allocation of facts and their more doubtful relatives into certain groups, on a basis of soundness, of importance, and of timeliness. Of course, importance and timeliness are largely influenced by local conditions and the circumstances of local application. As to soundness, it is believed that these data would almost all, if not all, fall into one of the following groups.

#### I. Assured Health Facts:

- A. Those universally and practically applicable
- B. Those theoretically sound but limited in application because of the imperfections in available methods or for other reasons

#### II. Near Facts:

- A. Those about which there is a growing certainty, though as yet no absolute scientific assurance
- B. Those once generally accepted but about which there is an increasing element of doubt

#### III. Assured Health Fallacies

A study and classification of this type should furnish a valuable guide to health officers, medical societies, and especially teachers, lay health educators and those social workers and social agencies now so

vitality related to the proper and effective capitalization of verified health data. This suggestion is submitted for the consideration of the section.

#### A BALANCED VIEW

Finally, if we are to be assured of the continued sympathy and support of our public—the recipients of our health educational efforts—it is important to maintain a sane and balanced attitude. We do not need to accept the extreme individualism and pessimism of Hutchison, and other critics of current health educational effort, in order to take advantage of certain constructive points which these critics emphasize. Let us not present health as a matter exclusively of rules and regulations. Let us not present it as something almost impossible of attainment. Let us feature health rather than disease, so far as that is reasonable. Let us not exclusively preach health for health's sake, but remember that health after all is a means and not an end, and is to be striven for, or at any rate respected, as a basis for growth, character, service, and happiness. In influencing those whom we instruct, let us endeavor to avoid the creation of self-conscious, fear ridden, health prigs, who go by rote and timidly about their daily tasks, with germ-catching respirator and antiseptic mouth wash ever at hand. Let us rather aim at the development of health informed, intelligent, and courageous adventurers in life.

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### Recent Child Welfare Measures in Spain

THE Government of Catalonia, Spain, decided to send 4 teachers to England, Austria, and Belgium for a 3-month study of kindergartens in those countries. It intends to establish kindergartens and day centers for children of school age whose parents are employed outside of their homes.

Education of defective children is receiving a great amount of attention in Spain. The Institute of Mental Education, a private organization interested in the education of retarded children, has sent an appeal to all members of the National Legislature of Spain, asking them to make satisfactory provision for the education of mentally defective children. At the same time the Spanish League for School Hygiene decided to present to the Minister of Public Instruction a memorandum on the essential points of school hygiene, which, in the opinion of the League, should be included in the public education law that is expected to be enacted before long.—*Maternità ed Infanzia*, Rome, Nov., 1931, p. 1212.



# Incidence of Tuberculosis in the Industrial Population \*

LOUIS I. DUBLIN, PH.D., F. A. P. H. A. (*Life Member*)

*Third Vice-President and Statistician, Metropolitan Life Insurance Company, New York, N. Y.*

FOR a long time, it has been realized by those who have studied the tuberculosis problem that the disease is not uniformly distributed in the population as a cause of sickness and of death, but that it is concentrated in certain strata and groups. In fact, the campaign to control the disease is more and more directing its attention to these classes and groups. Common observation and everyday experience have shown that tuberculosis is much more prevalent in the industrial population of the country than in the agricultural, the commercial, or in the professional trades. It is the purpose of this paper to point out certain variations in the tuberculosis death rate in the various elements which compose the industrial population. This should prove to be an important aid to the movement against tuberculosis, as it will show where the disease takes the heaviest toll of life, and where it is less prevalent. Such knowledge should make it possible to economize effort and to concentrate resources where they will do the most good.

By the industrial population I mean that large section of the people who live, for the most part, in the cities and towns, and who draw their support from employment in the industries of the country. They are, almost altogether, wage earners and their dependents, including women and children. I use this term "wage earners," knowing well its limitations, to identify the group I shall discuss with that large number of people who are insured in the industrial insurance companies of the country. I might have entitled this paper with more propriety, "The Incidence of Tuberculosis among Those Insured in the Industrial Department of the Metropolitan Life Insurance Company." The advantages gained by using this material are many. It covers a period of 20 years; relates to a population extending over the states and provinces of the United States and Canada; and includes millions of negroes as well as white persons—virtually all city dwellers who live on wages.

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\* Read at a Joint Session of the Vital Statistics and Epidemiology Sections of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 16, 1931.

Tuberculosis is primarily a disease of the working classes of the country. In 1930, for example, the death rate from all forms of tuberculous disease, among the industrial policy holders of the Metropolitan, was 81.3 per 100,000. In contrast, the death rate for the ordinary policy holders for that year was only 48.7 per 100,000.

These ordinary policy holders are persons who carry insurance ranging from a minimum of \$1,000 up to hundreds of thousands of dollars. In the Metropolitan, a great many of the ordinary policy holders carry industrial insurance also. The ordinary department death rate for tuberculosis would be lower still if these were excluded. For example, among those who carry insurance in policies for \$5,000 or more (among whom very few carry industrial insurance), the rate was only 17 per 100,000; and among the many employees of the company the rate was 40 per 100,000. It is clear, therefore, that the two main classes of the population are sufficiently far apart in their tuberculosis death rate to show how important is the industrial factor.

We may still further drive home this contrast by recording the fact that the death rate from tuberculosis in the general population of the U. S. Registration Area for the last year available, 1929, was 76 per 100,000 of population, as compared with 87 for wage earners and their dependents. But this figure (76) includes deaths from tuberculosis in the industrial population, as well as in all of the rest. If it were possible (which unfortunately it is not) to obtain the death rate from tuberculosis for the entire population, outside of the industrial class, the rate would be considerably lower than 76. A closer approximation, perhaps, to the tuberculosis death rate of the non-industrial population is the rate for 1929 for the rural area of the United States. That death rate was 74.7 per 100,000,\* but even this figure is much higher than the true rate for actual, permanent residents of the rural districts, because it includes that large number of deaths of city residents who went to rural communities in search of health, and died there either in sanatoriums, hospitals, or in private homes.

There can be no question, in view of these figures, of the heavy concentration of tuberculosis as a cause of death in the urban industrial group of the population. Every refinement we could make, which would separate out those who work for salary, or on farms, from those who work for wages in industrial establishments, would make the distinction all the greater. I do not for a moment suggest that tuberculosis is not an important factor in the mortality of the farming population, or that it does not strike down others than the industrial workers in cities; but it does this more infrequently.

\* When general population death rates for 1930 become available a still lower rate will be shown, and a greater contrast with the 1930 rate for the industrial policy holders, 81.3.

TABLE I

DEATH RATES PER 100,000 FROM TUBERCULOSIS—ALL FORMS. BY RACE, SEX AND AGE PERIODS.  
METROPOLITAN LIFE INSURANCE COMPANY, WEEKLY PREMIUM-PAYING INDUSTRIAL BUSINESS.  
1911 TO 1930

Tuberculosis—All Forms											
Year	One and Over	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74
White Males											
1930.....	68.0	21.7	8.6	7.9	34.3	80.2	100.6	141.0	177.2	172.2	151.2
1929.....	73.1	25.6	9.0	7.2	38.3	81.4	120.8	153.9	183.6	167.8	159.1
1927.....	77.9	29.7	10.0	9.2	44.2	85.4	129.9	167.4	191.0	174.9	153.1
1925.....	84.3	29.1	9.5	11.4	53.7	103.0	135.6	187.1	204.0	181.8	179.9
1923.....	97.9	37.2	13.6	11.1	52.9	130.3	169.3	202.5	225.5	206.7	201.7
1921.....	99.5	35.8	15.2	14.6	62.5	142.8	160.2	207.4	215.5	203.9	192.9
1919.....	145.2	57.8	19.0	17.4	90.0	153.9	240.4	352.4	353.1	271.2	242.5
1917.....	194.3	71.2	23.7	20.1	106.7	211.5	344.1	488.7	461.6	360.9	282.6
1915.....	201.1	68.7	28.0	15.8	91.7	218.8	359.4	517.6	456.7	356.4	262.9
1913.....	218.2	80.5	23.8	19.9	113.0	252.9	404.3	542.5	473.5	366.1	256.2
1911.....	230.8	75.6	27.8	21.4	115.9	288.6	424.1	606.1	455.5	392.8	303.6
White Females											
1930.....	57.1	23.2	8.7	14.1	69.5	108.6	90.7	66.3	57.1	66.7	72.4
1929.....	63.0	28.0	8.1	14.4	70.8	130.9	105.3	71.6	61.0	66.3	81.2
1927.....	70.9	27.8	10.4	15.8	93.3	141.7	118.5	79.6	67.7	69.2	82.8
1925.....	76.7	30.3	12.5	18.1	92.9	155.4	130.3	92.7	70.9	74.7	81.1
1923.....	88.2	31.3	11.8	24.4	107.4	167.4	144.7	111.3	91.9	81.2	96.3
1921.....	95.2	36.8	14.8	28.4	118.9	186.9	151.8	118.6	90.9	87.9	106.2
1919.....	125.2	54.3	22.2	35.6	145.8	228.4	214.3	162.7	121.1	115.4	116.2
1917.....	135.0	69.4	24.5	38.8	160.0	238.0	220.0	180.6	134.9	128.7	117.9
1915.....	141.5	70.7	26.0	37.3	146.4	224.5	234.8	206.5	141.8	140.9	133.9
1913.....	147.7	88.1	29.8	39.7	144.5	230.0	247.7	214.0	151.0	136.4	154.6
1911.....	165.4	81.6	35.8	39.1	155.2	263.3	293.6	260.4	161.7	150.7	149.4
Colored Males											
1930.....	223.8	97.2	51.1	73.3	245.4	351.5	295.1	258.7	275.8	204.4	229.8
1929.....	226.4	125.0	55.4	65.8	272.1	377.7	288.2	266.5	245.6	200.4	174.0
1927.....	227.6	129.6	55.7	65.4	273.0	341.5	273.2	290.7	251.5	212.7	191.7
1925.....	224.9	137.2	43.7	85.3	300.6	334.7	276.5	264.7	242.7	211.4	166.0
1923.....	242.9	139.2	86.0	76.2	285.3	362.3	314.7	286.3	261.3	204.2	206.1
1921.....	249.1	139.3	77.0	101.3	293.4	353.2	309.9	295.1	264.3	238.0	272.2
1919.....	319.7	203.8	102.7	177.7	339.2	435.4	388.9	392.5	351.9	289.4	317.1
1917.....	414.9	197.4	133.4	136.1	450.0	547.5	527.8	562.8	482.3	350.5	381.3
1915.....	432.8	217.8	134.0	140.1	389.6	532.8	583.6	608.4	436.2	486.6	357.0
1913.....	428.6	282.2	134.8	147.1	412.7	592.5	545.7	575.8	494.7	446.7	350.6
1911.....	422.2	345.5	175.4	151.8	416.2	610.6	548.8	488.6	478.2	465.6	364.4
Colored Females											
1930.....	213.0	97.7	53.9	123.1	368.7	398.1	301.9	182.4	139.2	113.6	113.9
1929.....	220.1	126.0	66.2	125.6	383.7	432.0	293.1	194.9	149.0	100.8	84.0
1927.....	228.4	118.4	49.6	126.5	421.6	433.8	339.6	177.3	124.0	97.2	106.9
1925.....	228.0	116.0	56.2	154.4	431.4	421.2	301.8	184.5	134.1	116.0	99.5
1923.....	245.7	107.6	59.3	153.6	444.2	489.7	317.1	214.2	161.6	125.4	105.0
1921.....	285.8	133.4	74.2	205.1	474.4	622.4	374.6	214.7	178.1	137.0	123.1
1919.....	328.9	157.6	122.3	240.4	642.2	551.6	404.1	283.9	191.1	173.6	196.5
1917.....	371.7	231.1	163.7	291.3	660.7	587.5	479.4	332.0	213.8	176.7	189.7
1915.....	394.2	315.2	145.9	285.4	665.1	638.7	497.3	345.5	271.1	220.1	184.7
1913.....	363.1	313.0	132.7	243.2	601.5	612.1	443.0	366.2	187.8	159.8	194.3
1911.....	415.1	269.7	178.9	315.7	643.1	735.8	511.3	379.1	234.4	225.4	173.2

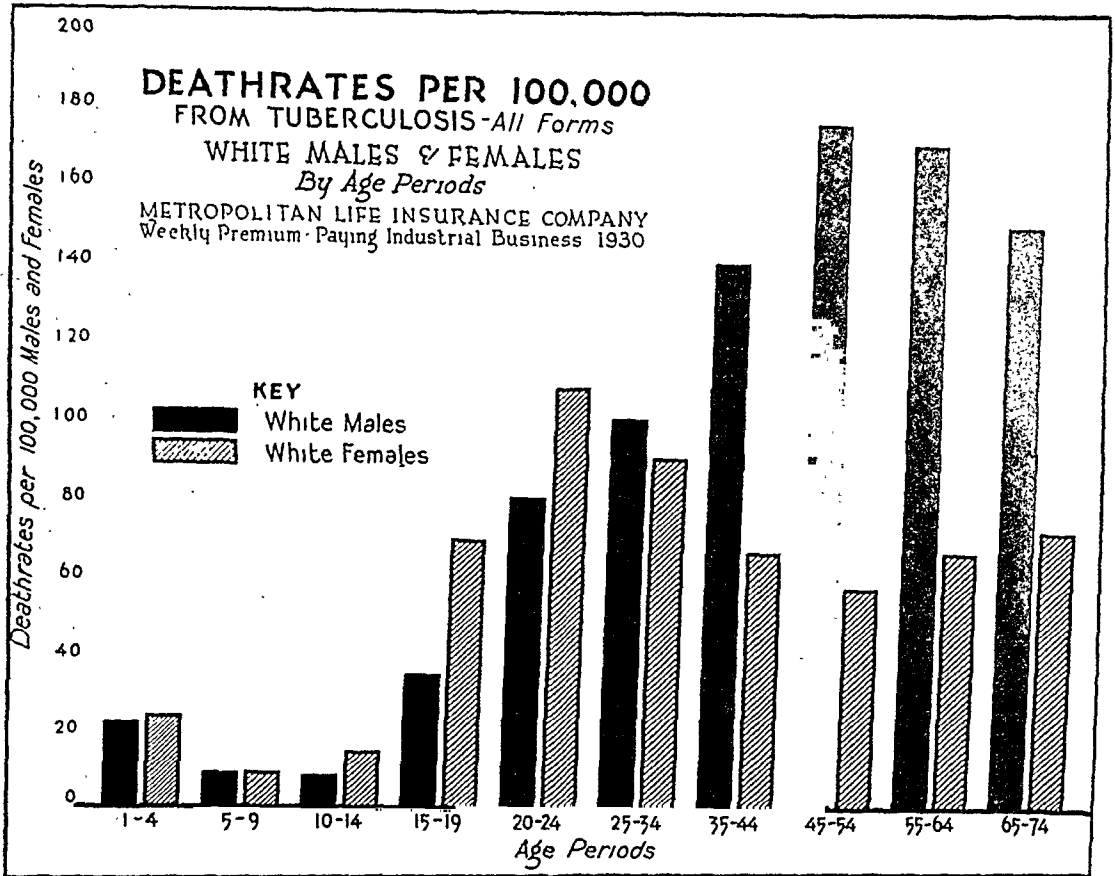
It is safe to say at this time that, by and large, tuberculosis is rapidly becoming a minor cause of death in all but the industrial classes of the population. We shall later call attention to a few apparent exceptions to this statement. But, to illustrate the essential truth of what I am saying, it is only necessary to note the tuberculosis death rates in 1929 of 27 for the State of Utah; 32 for Nebraska; 33 for Iowa; 34 for Wyoming; 35 for North Dakota; and 37 for Idaho and Kansas. In these states, there is a total population of 7,589,190, of whom about two-thirds (63.4 per cent) are rural dwellers, and only a small percentage may be classified as in the industrial population. In these states certainly it may be said that tuberculosis has already become a minor cause of death.

It would be misleading, however, if we did not call attention to the tremendous improvement that has occurred in the incidence of tuberculosis in the industrial population during the last 20 years. In fact, the improvement has been greater in the industrial classes than in the nation as a whole, or in any other major group of the population; for we find, as between 1911 and 1930, a decline in the mortality from tuberculosis of 64 per cent. In other words, for every 10 lives lost on account of tuberculosis in 1911, only 4 were lost in 1930. In the general population, the reduction in 1929, as compared with 1911, was only 52 per cent. Again, I wish it were possible to indicate the decline in other specific population groups, but the only other one for which data are available is a constantly increasing rural area, which between 1910 and 1929 shows a decline of 41 per cent. Obviously, the disease we are discussing was a much more important factor in the life of all elements of the population 20 years ago than it is now; but this applies particularly to the industrial classes. Yet tuberculosis is still the third cause of death in the industrial and the seventh in the general as well as in the rural population.

Within the industrial classification, the disease will be found concentrated primarily among males and among colored persons. Taking the figures for 1930 for insured white persons as our guide, we find no significant difference between the sexes under age 10. From ages 10 to 15, however, the mortality among females is higher by more than 75 per cent; and between 15 and 20 it is twice as high among white females as among males. Between 20 and 25, it is still 35 per cent higher among white females; but after age 25, the rate is uniformly lower among females; and at the age period 45 to 54 it is only one-third as high. Figure I\* shows the relative importance of the disease

\* The three charts used in this paper are similar in form to those prepared by Miss Jessamine S. Whitney, Statistician, National Tuberculosis Association, for her "Facts and Figures about Tuberculosis." The charts have been brought up to date.

FIGURE I



as a cause of death, in 1930, in the two sexes of the white classification.

Uniformly, the colored people show higher rates than the whites. At some of the younger ages, the rates for the colored are from 5 to 9 times as high as those for the whites, although after age 35 they are less than twice as high for males. Toward old age, the differences become less marked. Table I shows the contrast between white and colored persons on the basis of the 1930 mortality experience in the Metropolitan's industrial department.

With the colored, as with the white, there is substantially no difference under 10 years in the mortality rates of the sexes. Between 10 and 20 the rates for females run from 50 to nearly 70 per cent higher than for males, instead of 100 per cent higher, as they do in the case of the whites. With the colored, it is not until age 35 is reached that the death rate for males exceeds that of females, whereas this condition obtains from age 25 with the whites.

Occupation plays an important part in the incidence of tuberculosis and in its mortality. The very highest rates for the disease are found among those exposed to silica dust. Included here are a large number of workers in ore mills and mines (except coal mines), in the

building industries, and among grinders and buffers, stone workers, pottery workers, employees of foundries and other metal industries, and of the clay and glass industries. Another group having a high death rate from tuberculosis includes those employed in low grade occupations, more particularly common laborers in a variety of industries, longshoremen, porters, freight handlers, watchmen, hucksters, and peddlers.

Certain types of factory work have long been associated with high death rates from tuberculosis, although the mortality among these employees does not reach the figures for those exposed to silica dust. Included among these are the cigar and tobacco workers, shoe factory operatives, those engaged in certain textile occupations, and to a lesser extent workers in the printing trade.

Again, there are a number of occupations, in which there is more or less exposure to organic dust, and which show high mortality from tuberculosis. Among these are barbers and hairdressers, furniture and other wood workers, bakers, textile mill workers, hatters and hat workers (both wool and fur felt), and cigar makers and tobacco workers. The last named occupation has long been recognized as one with an especially high incidence of tuberculosis. In addition to the dust hazard, there is exposure to nicotine and often to general insanitary conditions in the workshops. But it is necessary to point out that in this industry wages are low, and the work attracts many men of poor physique and low resistance.

Another group in which tuberculosis takes a large death toll is laundry workers. This may be due, in part, to the fact that these workers are sometimes exposed to infected material; but the chief factor in their high mortality is probably the conditions of heat and humidity in which they work.

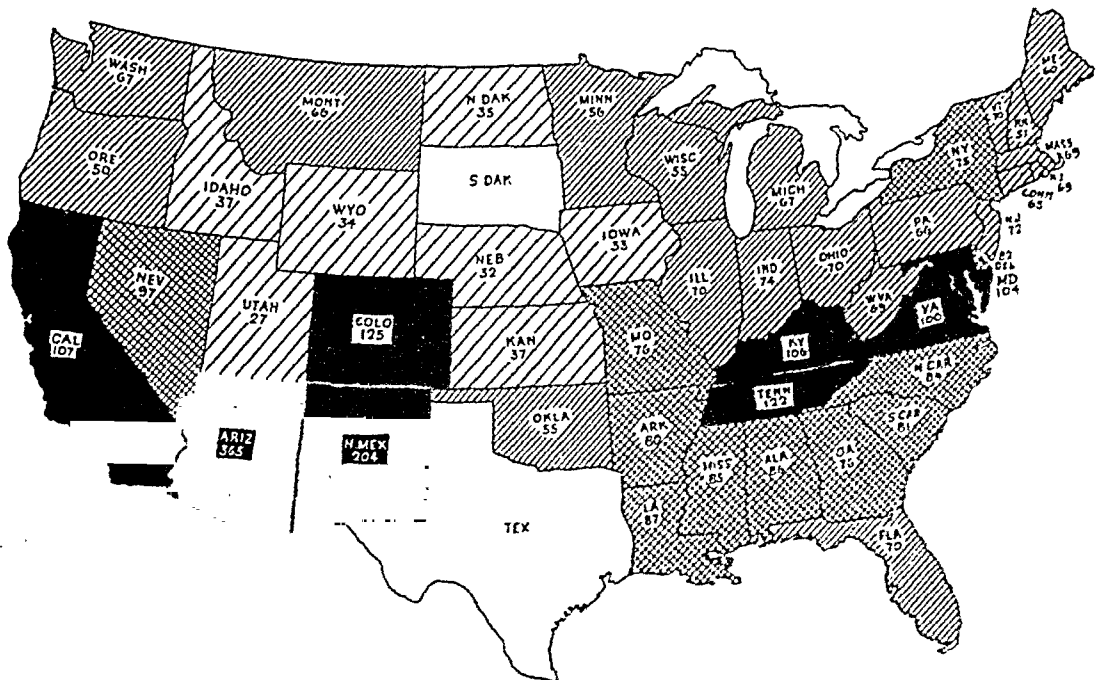
There are other employments in which there is a relatively high incidence of tuberculosis, although they are not associated with any definite industrial risk. Among these are tailors and other clothing workers, cobblers, and slaughter and packing house employees. Clerical workers and bookkeepers also have a higher than average incidence. Here the factors of confinement, poor ventilation, and fatigue, undoubtedly play their part in reducing resistance to infection.

This paper should not close without a brief reference to the geographical aspects of the mortality from tuberculosis. For this purpose I shall have to use data for the general population, even though this paper's title would seem to restrict my discussion to the industrial population. I have already referred to the extremely low mortality in the general population for certain states with predominantly rural.

and non-industrial populations, in order to contrast their low tuberculosis death rates with those of states where the people are more or less concentrated in the cities—and are largely wage earners.

First of all, it will be necessary to disregard the figures for certain states, like California, Colorado, New Mexico, and Arizona, which have very high tuberculosis death rates, solely because thousands of tuberculous people go there every year in the hope that favorable climatic conditions will arrest the disease. Many of these people die each year and thus swell the mortality rates for these states to a point many times in excess of the figure for the permanent residents. There are, however, 4 states where the ravages of tuberculosis are worse than in any others, namely, Tennessee, Kentucky, Maryland, and Virginia. This applies, with the exception of Virginia, to both the white and colored populations. Aside from these states, the following (in addition to the "cure seeker" states) have tuberculosis death rates in excess of the average: Alabama, Arkansas, Delaware, Louisiana, Mississippi, Nevada, North Carolina, and South Carolina.

FIGURE II  
DEATH RATES FROM TUBERCULOSIS - ALL FORMS



REGISTRATION AREA - 1929

LESS THAN 50 DEATHS PER 100,000 POPULATION

50 TO 75 DEATHS

75 TO 100 DEATHS

100 DEATHS AND OVER

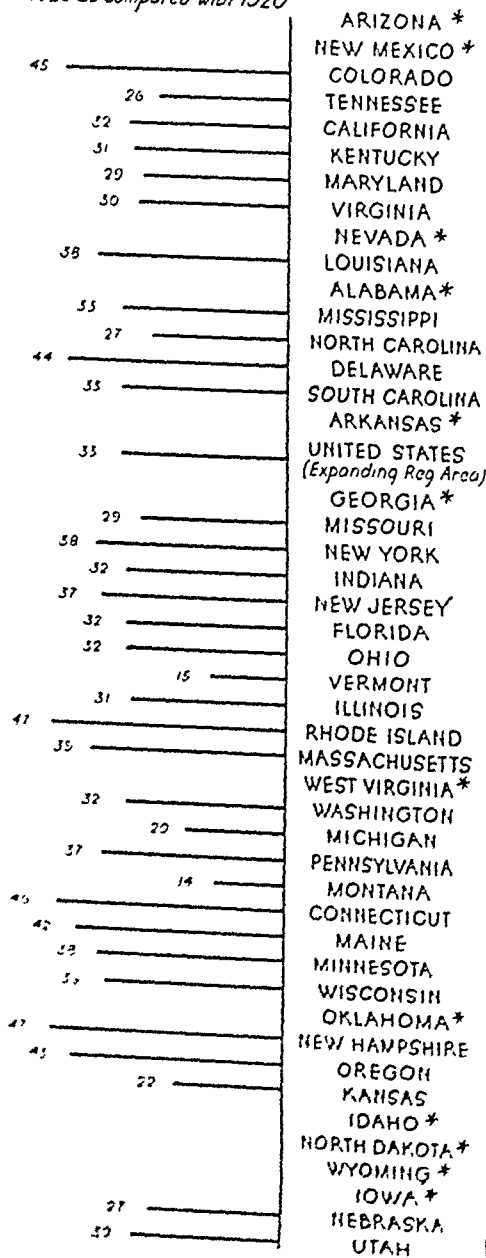
NON-REGISTRATION AREA

DEATH RATE UNITED STATES REG AREA - 76 PER 100,000

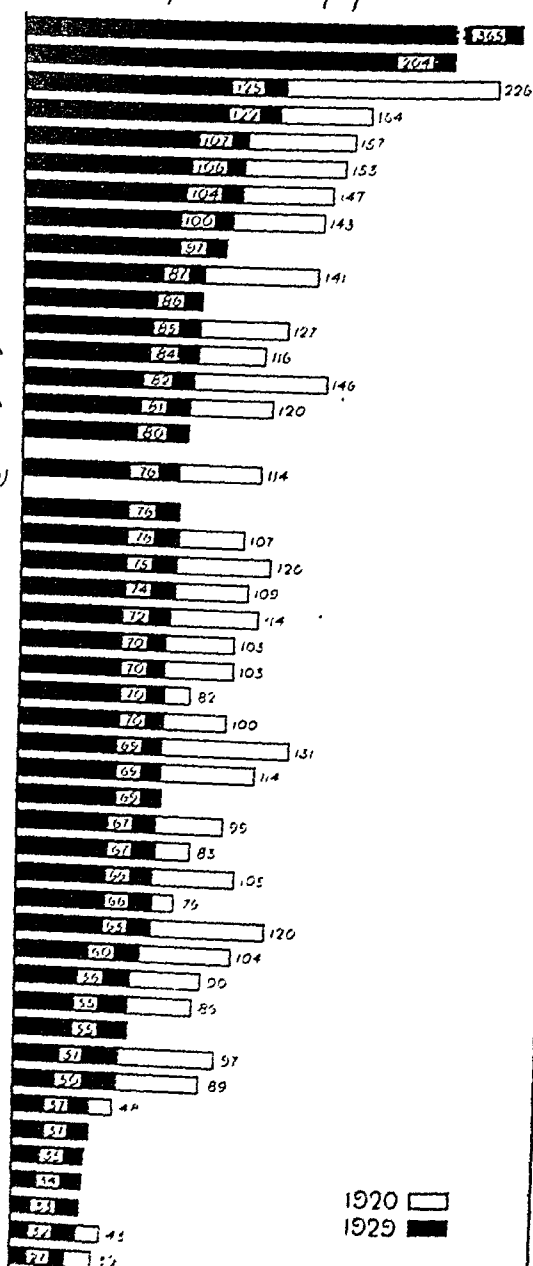
FIGURE III

# RANK OF REGISTRATION STATES In Death Rates from Tuberculosis - All Forms and Per Cent Decrease - 1920 and 1929

Percent Decrease  
1929 as compared with 1920



Deathrate per 100,000 population



1920   
1929

\* Not included in Registration Area in 1920



Figures II and III show graphically the tuberculosis mortality rates in the several states, in 1929, together with the per cent decline in that year, as compared with 1920 for each state. The map shows the 8 "black spots," states in which the tuberculosis death rate in 1929 ranged from 100 per 100,000 up. As noted previously, the high mortality in Arizona, New Mexico, Colorado, and California is due to deaths of non-residents, and the most serious situation prevails in Tennessee, Kentucky, Maryland, and Virginia. In the last named, the tuberculosis death rate among the white population is not far from the average figure for whites in the United States. Negroes, however, constitute 27 per cent of Virginia's population; and their excessive mortality from tuberculosis raises the death rate for the state to one of the highest figures in the entire country. In Maryland, too, the problem is largely with the negroes, although the mortality from tuberculosis among the whites is also above the average.

If it were possible to obtain resident death rates for tuberculosis for each of the states the shadings in the map would be changed in several instances. I strongly suspect, for example, that the figures for Nevada and North Carolina would be materially lower if deaths of non-residents were excluded.

In Figure III, attention is directed in particular to the per cent declines for the several states. It is encouraging to note that no state fails to show a lower tuberculosis death rate in 1929 than in 1920; but one is immediately impressed with the fact that for each of the 4 states where the situation is the gravest, the drop in the death rate has been less than the average decrease in the United States (expanding registration area).

Large cities whose tuberculosis mortality in 1929 was in excess of the average for all cities in the registration states, considered as a group, are: Albany, Atlanta, Baltimore, Birmingham, Boston, Buffalo, Chattanooga, Cincinnati (very high), Cleveland, Columbus, Denver (due entirely to tubercular transients from other states), Detroit, Duluth, El Paso (for the same reason as Denver), Fall River, Houston, Indianapolis, Jacksonville, Kansas City, Kansas, Kansas City, Missouri, Knoxville, Los Angeles (for the same reason as Denver), Memphis (very high), Nashville (very high), Newark, New Bedford, New Orleans (very high), Manhattan and Richmond Boroughs of New York City, Norfolk, Philadelphia, Richmond, San Diego, St. Louis, San Antonio (very high—probably from non-resident deaths), San Francisco, Scranton, Toledo, Trenton, Washington (due to an extremely high rate among negroes—the mortality is not high among whites), and Worcester.

I have, also, comparable data to show the relative mortality from tuberculosis among the insured Canadian wage earning population, as compared with the death rate in the same group in the United States. The figures for Canada are based upon the mortality experience of about 1¼ millions of industrial policy holders of the Metropolitan Life Insurance Company. They relate to a period of 6 years.

TABLE II

DEATH RATES PER 100,000 FROM TUBERCULOSIS (ALL FORMS) AMONG INDUSTRIAL POLICY HOLDERS IN THE UNITED STATES AND CANADA COMPARED

Year	Death Rates per 100,000			Per cent Excess Canada over United States (White)
	United States		Canada (Total Persons)	
	Total Persons	White		
1930	79.7	59.0	97.3	64.9
1929	86.2	64.9	96.8	49.2
1928	89.8	68.4	94.3	37.9
1927	93.0	71.7	100.9	40.7
1926	98.8	77.6	102.5	32.1
1925	97.7	78.4	104.1	32.8

It will be seen, first of all, that the tuberculosis death rate runs uniformly higher in Canada. Furthermore, the decline has been small in recent years, by no means matching the improvement in the United States. Even when we include the mortality among almost 2½ millions of negro policy holders (as we do in the first column of this table), the Canadian death rate exceeds that for the United States; and it must be borne in mind that the tuberculosis mortality rate for negroes runs about three and one-half times that for the whites. As the Metropolitan has comparatively no negroes at risk in Canada, the really significant comparison is that with the insured whites in the United States. There is a wide gap between the Canadian and United States figures. As a matter of fact, with the slow decline in Canada and the abrupt drop in the United States the excess in the Canadian tuberculosis death rate is becoming greater every year. These figures, it must be remembered, relate almost exclusively to city dwellers. Canada's relatively unfavorable record is due entirely to the very high death rates in the industrial populations of the cities in Quebec, Nova Scotia, and New Brunswick. For the remaining five provinces, the mortality from this disease is well below the average for white wage earners in the United States.

On what elements of the population, then, should the attack on tuberculosis be concentrated from now on? First of all, upon the wage

earners in American and Canadian industries, and their dependents. In this group, despite the splendid progress that has been made, tuberculosis still ranks third among the causes of death. Thus, where the greatest progress has been made lies a great opportunity for further progress. Within this wage earning element, the concentration should be primarily on males, except between the ages of 10 and 25, where the mortality among females runs from 14 per cent to more than 100 per cent higher. Second, upon the negroes, both in the industrial and general population, where the reduction in the mortality rate has by no means kept pace with that among the whites—more especially within the last 10 years. Here probably lies the greatest opportunity of all, especially in the age groups under 25, where the negro death rate exceeds the white by from four- to almost ten-fold. Third (and this lies within the field of the industrial hygienist), among those engaged in the several occupations I have mentioned—more particularly among those exposed to silica dust. Fourth, in the general population, both white and colored, of Tennessee and Kentucky, and to a lesser extent in other states, mostly in the South, where the tuberculosis death rate runs above the average; also among the populations of over 30 cities. Fifth, among industrial wage workers and their dependents in the cities of the Canadian provinces of Quebec, Nova Scotia, and New Brunswick.

There is every reason to believe that if the health officers and health agencies of the United States and Canada would concentrate their efforts on these groups of the population, a very definite reduction in both cases and deaths would result. Up to the present time, even lacking such particular concentration of effort, the death rate has declined each year among the industrial population. It should be possible, without undue expenditures of money, to increase the rate of decline. The important thing to do is to concentrate the energy and intelligence of the medical and public health services of the communities along the lines I have indicated. The immediate goal of the tuberculosis movement should be to accomplish for the industrial population what has apparently been brought to pass for those who are somewhat more advantageously placed socially and economically. This can and will be done.

NOTE: Other papers from the symposium on tuberculosis will appear in subsequent issues of the JOURNAL.

# What Is Health News?\*

GEORGE F. WRIGHT

*Editor, Montreal Star, Montreal, Canada*

THE putting forward of such a question as "What is Health News?" opens up a far wider range than would appear at first, for I take it that it is not only a question of what is or is not health news, but how such news can be most attractively and most persuasively transmitted from its source to the general public. That is to say, it is not only a question of health news in itself but of the vehicle, and the machinery of transmission as well. How can health news be presented in its most attractive form so that, in the language of the stage, those who present it will be able to "get it across the foot-lights"?

First, I think it is essential, in so far as the newspapers are concerned, that the copy submitted to them should be arranged and written by a newspaper man, that is, one who is skilled in the craft of journalism. I know that there is a very prevalent opinion that anyone can write stories for the newspapers and that anyone with ordinary common sense can edit a newspaper. I have not occupied the editorial chair for several years without having this forcibly thrust upon me many times. Scarcely a day passes but some male or female applicant for a position, plus salary—always plus salary—approaches me with a request for employment. When I pose to them the obvious question, "Have you had any experience in newspaper work?" they almost invariably reply, "No, but I have always felt that I would like to write for the newspapers and I once wrote a letter to the editor that was printed." Sometimes they vary this by saying they used to write for the school magazine, or they have had friends, or relatives who have been employed on newspapers at various times.

It has often struck me that these same people would never think of going to a doctor and saying that they have always been interested in operations for appendicitis or tracheotomy, and although they had no experience in surgery and no knowledge of anatomy they were simply burning to hold scalpel and forceps in their hands. Nor would they

\* Read before the Public Health Education Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 17, 1931.

go to an engineer and express their admiration of the beauty of a steel skeleton skyscraper and suggest that, as they had walked past so many of these buildings and looked with envy on them so often, they might be employed to erect one. I do not believe that doctors, lawyers, engineers, dentists, or other professional men are so plagued; but I am convinced that there is a very widespread belief that the newspaper craft can be learned overnight, and that the will to succeed is more than half the battle.

May I, before this gathering of men of brains and culture, do my bit toward dissipating this error. The newspaper profession requires just as much brains, and just as much training, and just as great native gifts, and just as much genius, as any other profession. I know that the universities neglect this field of training, but that does not imply that the years of training should not be long and arduous. Good newspapermen, like great poets, may be born and not made, but they must pass through a long course in human experience and undergo an exhaustive training before they are competent to be entered as journeymen in this great craft. If, in the process of apprenticeship, they have starved and suffered from cold and had no place to lay their heads and been buffeted by the world, but have won through, they are all the better for the process of sublimation.

May I, therefore, make my first point—that the organization, or individual, the association, the company, or the professor, who wants to get his health news across, should engage a man trained in the art of journalism for that work. The journalist will not only prepare the material in the most suitable form for publication, but if he has had proper training he will know where to place his output and how to adapt its form to the individual requirements of the various newspapers, or the idiosyncracies of different editors.

If I may venture a little further, I might in all humbleness advise the newspaper man who has the preparation of that copy in hand to make his stories short and divide them into paragraphs of different sizes. The make-up man of a newspaper often finds it necessary at a moment's notice to discover a readable paragraph, or even a short sentence, which will fit into an obstinate corner. If such matter is available, it stands a good chance of being used, even if, on its own intrinsic merits, it might not have readily passed a censorious editor.

Next, with regard to the content of the news, medical men as a whole are loath to give publicity to their achievements, their discoveries and their researches. It is not so much, as a rule, that they shun the publicity, but that they fear their findings, which are to them something so intimate and personal as to become almost sacred, may

distorted in the presentation. They charge the newspaper with sensationalism and some mysterious quality which they call yellow journalism, if it endeavors to present a dull, abstruse, scientific subject in popular fashion. They seem to have a rooted objection to the presentation of their researches and discoveries in attractive form.

These same men, in telling clubroom stories to one another, would not hesitate to dress the facts of the story up so that they could hold the interest of those who heard them. A man who tells a story which commands general approval, and wins for the teller a reputation as a good fellow, is the man who presents his story to his listeners in a fashion that rivets their attention, excites their interest, and moves them to tears or laughter. This is exactly what happens when facts are presented to the newspaper man. He sifts the mass of indigestible facts and pounces upon the one that contains real human interest, and dresses his story up to make it readable. He is instantly accused of having given undue prominence to what was a minor fact of the great discovery and he is told that it should be presented in a methodical and orderly fashion which is immeasurably dull and would never induce anyone to read it.

If public health news is to be read by the general public, it must be presented in attractive and readable form, even at the expense of treading on the corns of the erudite professors who are primarily responsible for the sources from which the news originated. I do not mean to say for a moment that the newspaper should sacrifice accuracy and truth. A strict adherence to fact is the one motto which the editor is always placing before his staff. Contrary to the general belief, he does not incite them to such high imaginative flights that they soar far beyond the realms of truth and reality. He knows they have the imagination and he urges them in season and out of season to keep their feet on the ground of realism and truth, when their wings are itching to be spread in an upward and forward flight. But, conforming to the truth and the facts of the case, the newspaper article should be attractive in presentation.

Remember that the standard of intelligence of the newspaper reader is not the standard of intelligence of the university faculties. Out of every 1,000 readers of a newspaper 50 per cent would not gain passmarks in the simplest general knowledge test, so that the newspaper which persistently printed scientific and erudite articles would get a reputation for being "highbrow" which would damn its circulation.

So far as public health news is concerned, there are certain things to be remembered. The people as a whole are receptive to the idea of

health improvements. They are "sold" on the idea of public health, and the thing the newspaper has to do is to show the practical and definite steps that the readers must individually take to bring about a general improvement in public health. That is, readers like to see statistics showing that the death rate is being lowered year after year, and that some of the dread diseases are being conquered, but that type of reading alone will not advance the cause of public health one iota. What the reader has to do is to get into his brain the necessity of carrying out certain simple rules of living. The newspaper must impress this day after day, not openly with the broad sword, but with the finer thrust and parry of the rapier. The direct attack is not always the most effective. To tell people they are dirty and unhealthy will not accomplish the end of the public health teacher half so effectively as to inculcate into the individual the need of more soap and less foul air. The appeal may seem to be to the masses, but its reception is really felt individually.

Constant reiteration of plain truths is of value, but if that plain truth can be garnished and served up in a hundred different forms, as a clever chef might serve the humble potato, the work of the public health officer will be immeasurably lightened.

In conclusion, let me say that editors as a rule are willing to support efforts toward improvement of the public health by giving freely of their advice, their time, and the space in their newspapers. I would be ashamed to measure the prestige which a newspaper receives by the part it plays in fights against the common enemies, dirt and disease. I know that I am very proud to have been associated, in a very humble way, with the fight the *Montreal Star* has made for pure milk and for better health conditions, indeed prouder of this than of any other accomplishment as an editor.

Newspapers want your coöperation. It is your responsibility to obtain that coöperation, each in his own community.

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THERE has never been any inflation of public health service and it is, therefore, incapable of deflation. Furthermore, public health work has paid its way, being in fact one of the greatest investment services of our people. What we have put into public health has been paid back to the public many times over in reduced sickness and lower medical costs, and in the salvage of valuable lives. Fortunately, throughout the year and, in fact, throughout the period of economic disturbance through which we are now going, the public health has held up beautifully, showing the effectiveness of our health organizations. They may be relied upon even in periods of stress to do their work well."—Louis I. Dublin, Ph.D.

# EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

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## LUEBECK DISASTER

IT will be remembered that after the administration of Calmette vaccine for tuberculosis at Luebeck, Germany, a large number of the children became ill, the final result being that 68 of 76 children died of tuberculosis.

The work was under the charge of Professor George Deycke. On October 12, 1931, he and those who had assisted him were put on trial with the result that he was found guilty and sentenced to 2 years in prison while Professor Altstaedt was found guilty of homicide and sentenced to 15 months in prison.

Needless to say the affair caused intense distress throughout the world. Professor Calmette sent cultures of the same batch of vaccine to South American and other places, all of which were used without any ill effects. Altogether upward of a million children have been treated with this vaccine without any ill effects as far as has been observed.

It is perhaps needless to add that during the 4 months of this trial every available bit of evidence has been brought forward. The scientific side has been thoroughly discussed. Many scientific men have tested this vaccine on animals and on a number of children. In New York City the Department of Health has used it apparently with excellent results and certainly no ill effects. Two points which have arisen are: (1) that an error was made and virulent tubercle bacilli



were used instead of the attenuated vaccine; (2) that a different culture made from that advised by Professor Calmette was employed and that the vaccine reverted to the virulent type. The conclusion arrived at is that the hospital laboratory was not fitted for such work.

Cultures of tubercle bacilli and Calmette's vaccine were made side by side and it appears that one was accidentally substituted for the other and that these poor children received inoculations with virulent human cultures.

This conclusion seems justified in view of the large number of children inoculated in various countries with Calmette's vaccine without ill effect.

One cannot but feel the utmost sympathy with Professor Deycke and his assistants. Apparently at the beginning he became somewhat hysterical and destroyed some of the evidence. Later he showed himself to be a man as well as a scientist and declared that whatever mistake had been made he was responsible for it. The sympathy of all scientific men goes out to him. Sanitarians and laboratory men will be glad to know that the Calmette vaccine is not dangerous and that this disaster was due to an accident entirely unconnected with the vaccine dose.

### THE MEDICAL PROFESSION AND PUBLIC HEALTH

THOUGH some of our national bodies are cognizant of the bad effects of the general depression on health work through the discontinuance of activities and the resulting dropping of health workers, medical and other, and though there has been widespread fear of the malnutrition which would almost certainly result, comparatively few people, we believe, have considered the plight of physicians in the present emergency. Not only are they in less demand, since people consult them only when necessary, but the payment of fees has been deplorably cut, and the doctors find themselves hard put to it economically. There has been a large increase in the number of indigent ill and the doctors are expected to carry these, as, we are glad to say, they always have done in the past. At the same time, there has been no let-up in the demands made upon them by legislative bodies, taxation authorities, courts of justice, and similar bodies. The public is rapidly becoming educated to demand the best services, the use of modern methods of diagnosis, involving expensive apparatus, and easy access to fully equipped hospitals.

The education of the public is, in our opinion, all to the good. We

have welcomed the foundations, and recognize the good work which they have done. It is, however, equally sure that these various organizations, many of which have millions at their disposal, have to a certain degree made the lot of the practicing physician hard. Numerous organizations, some under medical control, but probably a greater number under lay control, have been aggressively assuming the direction of medical service along a number of lines. Some of this, like the education of the public, is all right. The average doctor is not a good business man. The calls on him are to heal the sick and relieve suffering. Except among a comparatively favored few located in large cities, the doctor does not enjoy a large income and his time is never at his disposal, owing to the many calls made upon him throughout the twenty-four hours of the day.

It can hardly be denied that there has been a growing unrest in the profession. State medicine has been talked about, and a certain number of the profession have felt that we have already gone too far toward it. State medicine is a bogey to American physicians and properly so, we believe. Just where to draw the line between State care and care by the family physician has been a puzzle for many years, and many believe that there is too much trespassing upon the field of the private practitioner, or, as a recent writer<sup>1</sup> has put it, "the State is becoming too paternalistic in health matters. . . . The family physician is the most important member of society and upon whom there rests the responsibility for protection of the health of the public more than upon any other factor in public health."

Recently the State Medical Society of Michigan<sup>2</sup> adopted a resolution instructing the President to appoint a committee to study the problems outlined, which they believe require immediate and critical attention. Among the reasons brought forward as producing the present emergency, are mentioned public health service operations, the Medical Corps of the Army and Navy, the Veteran's Bureau, narcotic and child health bureaus, federal and state laws, licensure laws, decisions of the Supreme Court, etc. They recognize without question the right and the duty of the government to impose reasonable requirements upon doctors and medical practice. They list also nineteen activities which have interfered with the doctor and medical practice, including the foundations, some of which are active in promoting county health units, state universities with hospitals and medical service, state tuberculosis sanatoriums, crippled children's work and hospitals, city health and school departments, welfare departments, etc., in addition to medical services conducted by industrial corporations, clinics, private and endowed hospitals, etc.

The problems confronting the medical profession, many of which have been voiced by the Michigan Society, are real and urgent. The current medical journals have recently carried a number of articles on the general subject, the particulars of which are given in the resolution mentioned.

In various states and cities, official commissions have been appointed to study legislation concerning general health, child welfare, tuberculosis, etc. Unofficial health organizations have performed most useful educational service. Many state medical societies have been considering the question of public relations, but coöperation so far has not been brought about to the degree which could be desired. "If we do not take the leadership, government will have to do it because public sentiment, when aroused, is quite likely to find ways of getting what it needs. Medicine is today in a strategic position. It can take leadership in the solution of problems. . . . Its public position on public health questions will determine its future influence. Health organizations get their chief incentive in medicine's failure in meeting present-day health problems."

Medicine has advanced tremendously—so has public opinion. We are going through a stage of transition. The doctor has possibly been too much engrossed in healing the disease and forgetting the patient, as well as the social problems involved in medical practice. The profession has become overspecialized, and the average doctor has been led to feel that some of the specialties—mental hygiene, for example—are beyond the ken of the average man. Certainly it involves knowledge and experience which the average practitioner does not have, and it is hard to see where he is going to obtain either, and at the same time make a living. Other problems, such as those presented by venereal diseases, are pretty well understood by the average practitioner, but involve tremendous legal and social obligations and responsibility. The clergy, and other well meaning but medically ignorant people, object to prophylaxis on moral grounds, apparently forgetting the innocent sufferer. The physician is a health officer, and as a rule, recognizes his duties very much more clearly than the social organizations which have interested themselves in the matter. Many believe with reason that we are in a state of transition which carries with it necessary problems, and some upset. The medical profession has shown the need of all of the services given by lay organizations, including vital statistics, public health engineering, etc. It has failed to recognize the differences between the practice of curative medicine and prevention, and also the fact that public health work constitutes a special calling, and requires special training. If the medical profession

is to serve itself and guard the honorable position which it holds, and has held at least since the Middle Ages, it must still lead in health matters, and be even more ready than in the past to coöperate in public affairs.

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2. Annual Meeting, Sept. 22, 1931.

## THE TWO-YEAR PERIODICITY OF MEASLES

THE Central Public Health Committee of the London County Council forecasts an epidemic of measles in London during the autumn of 1931 and winter of 1932.<sup>1</sup> Measles in epidemic form occurs in that city at intervals of 2 years, beginning late in the autumn and lasting some 6 or 7 months. Since the last epidemic occurred in 1929-1930, the next is expected about this time. About 50,000 children are affected during each outbreak. This periodicity at 2-year intervals has been observed since 1918 in New York City, though experience leads them to expect high prevalence of the disease in the even-numbered years and low prevalence in the uneven.

The year 1931, however, has been an exception to this rule, and the New York authorities are seeking an explanation. For the first 9 months of this year, 26,238 cases have occurred against 22,865 for 1930.<sup>2</sup> In the *Weekly Bulletin* a table for 12 years is given showing without exception the greater prevalence of the disease in even-numbered years, extreme cases being 2,101 for 1927 against 35,008 for 1928. The reasons for the greater prevalence observed for 1931 over that expected, and over that for the uneven-numbered years, are not clear, and the event has upset the calculations of the health authorities.

In London the 2-year periodicity seems to be very well established, and since the epidemics begin late in the autumn of the uneven-numbered years, we may say that most of the epidemics occur in the year following with the even number, which accords entirely with the observations in New York, though the London practice of combining the autumn and winter in this respect makes the comparison a little uncertain.

In London the deaths from measles have shown very gratifying decrease, from 9,538 in 1906-1910, to 3,715 in 1926-1930, the figures for the intervening years, with one exception, showing a steady decrease.

The plan in London is: (1) To make every effort to avoid contraction of the disease until after the 3d or 5th year, since the younger

the child, the more danger there is of serious illness; (2) To secure adequate nursing and medical care; (3) To remember that measles is particularly fatal among undernourished children and those living in bad surroundings. These causes operate in the same way in this country, though we would add to this particular program the avoidance of tuberculosis, since in both white and colored, but especially in the latter, tuberculous infection leads to a very high mortality following measles.

## REFERENCES

1. *Brit. M. J.*, Nov. 7, 1931, p. 866.
2. *Weekly Bulletin*, City of New York Department of Health, Oct. 24, 1931.

### SURGEON GENERAL HUGH S. CUMMING REAPPOINTED

THE nomination of Surgeon General Hugh S. Cumming of the U. S. Public Health Service to succeed himself was sent to the Senate on January 26 by the President. This is a cause for congratulation to the country and to the members of the Service. Under his administration, the activities and influence of the Service have constantly increased in various fields of endeavor. The recent establishment of the National Institute of Health has been one of the great advances which have taken place.

General Cumming has been Surgeon General during an exceedingly trying time. It is only necessary to recall the epidemics of meningitis, poliomyelitis, psittacosis, the flood conditions on the one hand, and the drought on the other, all of which have raised problems of extreme importance, affecting large areas of this country, and incidentally our relations with other countries with which modern means of transportation have coupled us so closely. All of these emergencies have been met and handled with judgment and efficiency.

Among the many perplexing complications which engage the attention of the authorities in Washington, it is a relief to turn to the work of the U. S. Public Health Service under General Cumming with its smoothness of operation and the accomplishment of worthwhile results of vast importance to health and happiness of our nation.

## ASSOCIATION NEWS

### DR. PETER H. BRYCE

THE medical profession has learned with deep regret of the death on January 15 of Dr. Peter Henderson Bryce, President of the American Public Health Association in 1900, and a member of its Executive Board from 1916 to 1921.

Distinguished alike as a physician and as a man of letters, Dr. Bryce was a product of Brant County, Ontario, having been born at Mount Pleasant on August 17, 1853. His education was received at Upper Canada College and the University of Toronto, from which institution he was graduated as B.A. in 1876. Progressively he acquired the degrees of M.A. (1877), M.B. (1880) and M.D. (1886).

He practised first in Toronto and Guelph, and was later appointed professor of chemistry at the Agricultural College in the latter city.

An outstanding member of the medical profession in Canada, Dr. Bryce had occupied many important positions. He was founder of the Ontario Department of Health, serving as secretary from 1882 to 1904. He was appointed chief medical officer of the Department of the Interior and Indian Affairs in 1904, a position he occupied until his retirement in 1921.

Since his retirement, he had identified himself with many learned societies. For a number of years he was President of the Arts and Letters Club of Ottawa, of which he was one of the early members and staunch supporters, and he

also became a member of the Canadian Historical Society.



PETER H. BRYCE, M.D.

The author of several works, including scientific volumes, Dr. Bryce had only recently completed the life of Sir Oliver Mowat, which is expected to perpetuate his memory in the field of Canadian letters.

Dr. Bryce joined the A. P. H. A. in 1883, and was made an Honorary Fellow in 1922.

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A. P. H. A. by the Sub-committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

*Health Officers Section*

- Dr. John E. Burch, Daytona Beach, Fla., Health Officer  
 Avon H. Elliot, M.D., Health Department, Wilmington, N. C., County Health Officer  
 Ernest M. Ewers, M.D., Somerset, Ky., Director, Pulaski County Health Department  
 Lunsford D. Fricks, M.D., 216 Canadian National Pier, Seattle, Wash., Medical Director, District No. 6, U. S. Public Health Service  
 Joseph C. Healy, M.D., 1 Market St., Lockport, N. Y., Health Officer  
 James H. McEachern, M.D., 401 City Hall, Tampa, Fla., City Health Officer  
 Z. V. Moseley, M.D., Kinston, N. C., County Health Officer  
 J. W. Roy Norton, M.D., Rocky Mount, N. C., City Health Superintendent  
 Louis J. Petritz, M.D., City Hall, Venice, Calif., Assistant Health Officer  
 Van A. Stille, M.D., Benton, Ky., Assistant Director, Bureau of County Health Work  
 Dr. James A. Summers, City Hall, N. Little Rock, Ark., City Health Officer  
 Clarence H. White, M.D., Box 480, Henderson, N. C., Health Officer of Vance County  
 W. Carter Williams, M.D., Health Department Building, Franklin, Tenn., Director, Williamson County Health Department  
 Richard F. Yarborough, M.D., Louisburg, N. C., Health Officer of Franklin County

*Laboratory Section*

- Maurice P. Lafleur, M.D., 1112 Route Lafleur-Duchêne, Port-au-Prince, Haiti, Teacher of Hygiene  
 Lyndon R. Rhodes, 67 Quincy Shore Drive, Atlantic, Mass., Dairy Chemist, White Bros.  
 Stanley J. Thomas, Ph.D., Lehigh University, Bethlehem, Pa., Professor of Bacteriology  
 Abdel M. Wahby, D.V.M., Bacteriological Laboratory, Cornell University, Ithaca, N. Y., Research Worker  
 Herbert C. Ward, 6214 3d Ave., Kenosha, Wis., Director, Biological Laboratory, U. S. Standard Products Co.  
 D. Evelyn West, Box 1001, Hartford, Conn., Microbiologist, State Department of Health

*Public Health Engineering Section*

- Louva G. Lenert, State Board of Health,

- Jacksonville, Fla., Chief Engineer; Director, Bureau of Sanitary Engineering  
 Chris G. Lightcap, R. R. 2, Box 63, Phillipsburg, N. J., Sanitary Engineer  
 Marvin T. Rowland, Chamber of Commerce, Texarkana, Tex., District Engineer, State Health Department

*Industrial Hygiene Section*

- Paul A. Davis, M.D., 1436 Delia Ave., Akron, O., Assistant Medical Director and Hygienist, Goodyear Hospital and Factory  
 Max Kummel, M.D., 315 Central Ave., East Newark, N. J., Industrial Physician and Surgeon

*Food and Nutrition Section*

- Harriet I. Albee, 108 Warren St., Concord, N. H., Assistant Chemist and Bacteriologist, State Board of Health  
 Julian H. Toulouse, Ph.D., 726 Bond Building, Washington, D. C., Director of Laboratory, American Bottlers of Carbonated Beverages  
 Mr. William J. Warner, 165 Capitol Ave., Hartford, Conn., Dairy and Food Commissioner

*Child Hygiene Section*

- Jozef Lubczynski, M.D., Grochowska 36, Warsaw, Poland, Health Officer (Assoc.)  
 Dr. Lloyd P. MacHaffie, 162 Clemow Ave., Ottawa, Ont., School Medical Officer  
 Leonard J. Piccoli, Ph.D., 88 E. 208 St., New York, N. Y., Professor and Head of Department of Materia Medica and Physiology, Fordham University

*Public Health Education Section*

- Herbert F. Hirsche, 90 Livingston St., New Haven, Conn., Executive Secretary, Cancer Control Committee, Department of Health  
 Mary A. Hodge, M.D., 319 Gittings Ave., Baltimore, Md., Professor of Physiology and Hygiene, Goucher College  
 J. Alphonse Lapierre, M.D., Ste Anne des Monts, County Gaspe, P. Que., Medical Officer of Health

*Epidemiology Section*

- Anson B. Ingels, 194 Adelaide Ave., Providence, R. I., Epidemiologist, State Public Health Commission

*Public Health Nursing Section*

Mrs. Anna Van W. Castle, 911 Delaware Ave.,  
Wilmington, Del., Director, Visiting Nurse  
Association

Letitia E. Lynch, County Health Dept., Santa  
Barbara, Calif., Supervising Nurse

Emma R. McLeod, 417 George St., New  
Brunswick, N. J., Public Health Nurse, Di-  
rector of Visiting Nurses Association

Alice M. Vallette, Potosi, Mo., Public Health  
Nurse, Washington-Iron Counties

Juanite R. Zamora, R.N., Thermal, Calif.,  
Public Health and School Nurse

*Unaffiliated*

Charles H. Dumais, M.D., 315 rue Lafontaine,  
Riviere-du-Loup, P. Que., Sanitary Unit  
Inspector

H. Wirth Edwards, M.D., Seligman, Mo.  
(Assoc.)

## TRAINING AND PERSONNEL

THE following bill which is before the legislature in the State of Massachusetts will be of news interest to the members of the Association as a development in the field of Personnel.

*House Bill 262*—An Act providing for Examining and Licensing Local Public Health Officers or Agents. 1932.

*Section 1*—On and after 1 year from the date of passage of this act no person shall be appointed as local health officer, or as an executive or agent of the board of health of any town or city having a population of 10,000 or more, or as the executive officer or agent of any group of towns having a combined population of 10,000 or more, unless he has been licensed as a health officer by the State Department of Public Health.

*Section 2*—A license as a health officer shall be issued by the State Department of Public Health to each person who passes an examination in sanitation and public health procedures.

*Section 3*—The examinations shall be conducted in such manner and at such times as the state department of public health shall determine.

*Section 4*—This act shall not prevent any local board of health from continuing in office, without examination and license, any health officer or agent who fills such office at the time of passage of this act.

*Section 5*—A fee of \_\_\_\_\_ shall be paid to the State Department of Public Health by the applicant for each examination taken for a license as health officer.

This bill is presented by the Massa-

chusetts Civic League with the endorsement of the State Department of Public Health, the Massachusetts Association of Boards of Health, the Schools of Public Health in Massachusetts, and with the support of the many professional workers.

In 1927, the American Public Health Association approved the "Principle of the Licensing of Health Officers Upon the Basis of Their Professional Qualifications." The bill quoted above is certainly in accord with this general principle.

No model bill has yet been developed within the Association, but many leaders in public health administration believe that the time has come for legislative action setting standards for appointments to various positions in the public health field. The Committee on Training and Personnel is at work through its sub-committees in the development of a vigorous program for developing both public support and legislative action looking toward the improvement of tenure for workers now in public health positions and toward the selection of trained individuals for future appointments. Subsequent issues of the JOURNAL will carry reports upon committee activities.



# PUBLIC HEALTH ADMINISTRATION

## VISUAL RATE CHART

GEORGE B. DARLING, JR., DR. P. H.

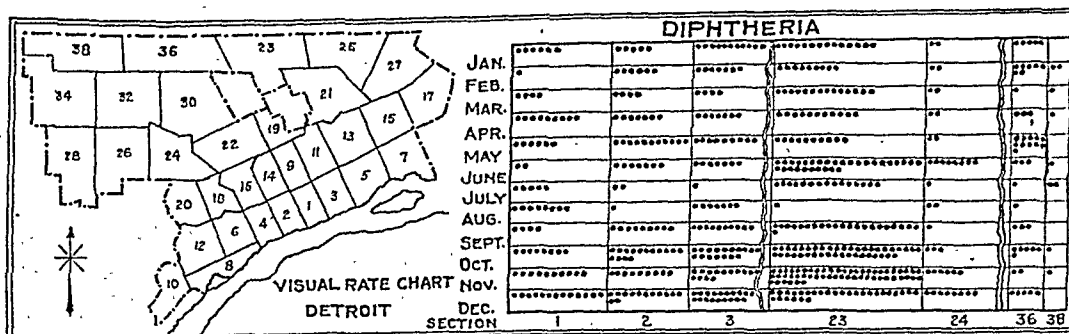
*Assistant Epidemiologist, Department of Health, Detroit, Mich.*

AN epidemiological master chart useful in the graphic presentation of epidemiological data by districts was submitted in a recent article in this section.<sup>1</sup> Although primarily intended for annual rates this chart may readily be adapted for routine or running records. In watching the situation from day to day or from week to week the usual procedure is, of course, to use spot maps showing approximately the location of the case, death, or service. This method has considerable practical merit, but it is very difficult to combine with the spot map graphical information concerning density and character of population, and obviously it is impossible to derive even relative ratios. Many methods have been proposed to get around these difficulties.

The visual rate chart presented herewith (only a fragment of the entire chart is presented in the accompanying illustration) has a certain usefulness in this regard. It may be used in connection with a spot map showing the exact location of the case, or it may be used alone if the general location need not

be known closer than the sanitary district. A detailed account of the construction of the chart was presented in the previous article. For practical purposes the idea is essentially that a bar is divided into sections according to the proportion of the population of the various districts. For instance, the width of section one is in the same proportion to the total length of the bar as the population of the section is to the total population. It may be desirable to divide the bar further into time elements. In the illustration months are used for this purpose.

When cases occur, instead of being spotted in the area on the geographical map to which they belong, they are spotted in the appropriate section of the bar chart. The dots and the spaces between need not be exactly of the same size but should be reasonably so. By referring to the illustration it will be seen that it is possible to put 13 dots along the horizontal axis of section 1 while only 5 dots of approximately the same size can be put in section 36. If there are 13 in section 1, and 5 in sec-



tion 36, the rate for the two districts must necessarily be the same (see the month of December). If there are only 6 dots in section 1, with 5 dots in section 36, it is apparent that the rate in section 36 is twice that in section 1 (see January). Again, if the line of dots goes twice across the available space in 36 and only half way in section 1, the ratio is obviously 4 to 1 (see May). It is thus apparent that comparable visual rates are available at any time since the number of cases will be shown in direct proportion to the population exposed.

Such a chart has a definite place in current statistical tabulations where it is important to know not only the number of cases but relative attack rates by

districts. Correlation of this information with that provided by the epidemiological master chart is useful in a rapid appreciation of the factors involved in the progress of an epidemic.

Dependent upon the use to which the data are to be put, the chart may be kept by convenient time intervals or may be made cumulative. The principle is essentially the same.

The visual rate chart has proved to be of considerably greater value than the ordinary spot map in that it permits the instantaneous derivation of visual rates without additional laborious book-keeping and statistical analysis.

#### REFERENCE

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**New York Health Center Districts Statistical Reference Handbook**—The Committee on Neighborhood Health Development of New York City, of which the Commissioner of Health is chairman, has issued a handbook of statistical reference data which is of value to public health and public welfare administrators as well as to statisticians. The 1930 federal census figures are given for each of 30 health center districts together with population trends covering the past 10 years. Information is presented for each district concerning births, deaths from all causes, infant deaths, tuberculosis deaths, registration of new cases of pulmonary tuberculosis, venereal diseases, and other communicable disease reports, with corresponding rates. School registration has been brought up to date. A section also deals with public health nursing requirements.

The report is designed to furnish a background for the further and more detailed study of health needs in each community as a basis for the sound and orderly development of district programs of public health, and should be an indispensable background

to district health officers for the future evaluation of local programs. It is also hoped that the handbook will be useful to the voluntary agencies in helping them to adjust their programs to local needs, and that it may prove of interest to other communities wherever the problem of district health center development is being considered.

It is noteworthy that the Committee on Neighborhood Health Development, which is aiding the Department of Health in the planning of district health centers, has in its membership two representatives from each of the five county medical societies.

The complexity, as well as the diversity, of the problems of the various districts in the city becomes apparent when the data presented are studied. Density of population in the city varies from a little less than 3,000 per square mile to slightly less than 85,000 per square mile. On the average, there are 125,000 cases of communicable diseases reported in an average year in greater New York. In normal years for 15 of the common communicable diseases, the case rates vary in different areas from 895 to 2,550 per 100,000 population.

The general death rate for the city as a whole was 10.7 in the 2-year period 1929-1930. The rate for Manhattan was 13.6; for the Bronx 8.6; for Brooklyn 10.2; and for Queens 8.9. Similarly, for the same period, infant mortality varied. The rate for the city as a whole was 57; for Manhattan 74; for the Bronx 47; for Brooklyn 55; and for Queens 49. But there was even greater diversity in infant mortality in the various health districts, the highest rates occurring in Central Harlem. The statistical data and excellent maps included in this handbook render it an indispensable aid in program planning.

New Haven, Conn.—In this city of 162,658 population, there were 14 cases of diphtheria, with 1 death, an adult, in 1930. There were no cases in the age group under 5 years. Five of the total cases were in institutions, 4 being in an orphan home. One of these cases was a new boy, 2 others had received 3 toxin-antitoxin administrations the previous year, while 1 boy had given a negative Schick reaction on 3 tests. The fifth case in an institution, a nurse, had received 3 inoculations the previous year. During the year there were found 214 carriers, 47 of these being in the age group under 5, and 8 being in the age group over 15. All but 5 were nasal carriers, and only 11 resulted in

positive virulence tests. Eighty per cent of the carriers were found by the communicable disease bureau personnel, 15 of the cases occurring among new arrivals seeking school admission.

During the year there were 200 cases of measles with no fatalities. For 4 years it has been the practice of the health department to provide special medical care of cases of measles and whooping cough in their homes if no private physician is in attendance. Relatively few measles cases were hospitalized in this epidemic, and the results of the supervision are noteworthy.

Among the 93 tuberculosis deaths, 69.8 per cent occurred in hospitals or sanatoriums and 78.5 per cent had been hospitalized. Eight-one of the cases were known to the bureau before death. A tuberculosis death rate of 57.2 is recorded. There were 341 new cases reported during the year, 278 having been reported by physicians. Of the 18,811 home visits made by the Visiting Nurse Association, 9,108 were to diagnosed cases, while 2,543 visits were made to post-sanatorium cases. The 349 cases admitted to hospitals and sanatoriums during the year received a total of 69,717 days of care.

At the summer camp, 101 children stayed an average of 65.5 days.—*Annual Report*, New Haven Dept. of Health, 1930.

# LABORATORY

## INTRADERMAL METHOD OF VIRULENCE TESTING OF *CORYNEBACTERIUM DIPHTHERIAE* \*

J. RALPH WELLS

*Department of Bacteriology and Immunology, Washington University School of  
Medicine, Saint Louis, Mo.*

THE procedure of determining the virulence of *Corynebacterium diphtheriae* by means of intradermal injection of pure cultures, as modified by Zingher and Soletsky<sup>1</sup> from Neisser's<sup>2</sup> method, or of mixed cultures as advocated by Havens and Powell,<sup>3</sup> Force and Beattie,<sup>4</sup> and others, has found considerable practical use because of its apparent accuracy, combined with its relative economy and simplicity. It has been adopted as a routine in some laboratories, while in others its use has been limited mainly to epidemiological investigations involving cases or carriers of diphtheria. It is also valuable in the testing of numbers of stock strains of these organisms when knowledge of their toxigenicity is requisite to other studies involving this group of organisms, since it is possible to test satisfactorily from 8 to 12 strains or more on one guinea pig, or 20 to 30 cultures on a large white rabbit, the latter animal being considered by some workers<sup>5</sup> as more sensitive to diphtheria toxin.

In attempting to utilize this method of testing virulence of diphtheria-like organisms, the author has recently observed a complication which seems sufficiently important to be reported, as there appears to be no discussion of it in periodicals commonly available in the English language. It is a point involving the interpretation of the results of intradermal tests of recently isolated cultures of *C. diphtheriae* and is inherent in the principle upon which this method is founded, viz., tissue injury due pre-

sumably to the toxigenicity of these organisms.

While testing a number of recently isolated pure cultures incident to another study in progress, using 0.1 c.c. amounts of 24 hour broth cultures of 8 different strains on each of two guinea pigs (Nos. 332 and 333) one of which (No. 332) had been protected 2 hours previously by intraperitoneal injection of 400 units of diphtheria antitoxin, it was noted that the corresponding sites of inoculation of one culture (No. 1177a) developed on both guinea pigs a severe necrosis by the end of the first day. These lesions increased in size from about 1 cm. diameter to approximately 1.5 cm. by the second day, while all sites of injection of other cultures remained distinctly negative on the protected animal and just as clearly positive on the unprotected guinea pig which died sometime during the 2d night after the inoculations were administered. Sloughing of the superficial portion of the skin occurred on pig 332 between the 3d and 4th days.

In common practice, especially when dealing with "field-cultures," such reactions occurring on both the test and the protected animals are likely to be read as negative. Thus Zingher and Soletsky,<sup>1</sup> who originated the idea of using one test guinea pig and one protected guinea pig in this type of virulence testing, say:

The results of the tests are noted in 24, 48 and 72 hours. Virulent strains produce a definitely circumscribed, local inflammatory lesion,

which shows a superficial necrosis in from 48 to 72 hours. In the control pig the skin remains normal, if the injections have been accurately carried out.

Havens and Powell,<sup>3</sup> who are the first to report the use of this method with "original diagnostic cultures," state that "there is but one dependable criterion for virulence, viz.; necrosis of the superficial layers of the skin of the test pig, while it is absent in the control."

Bull and McKee<sup>4</sup> discussing their work with "whole-cultures" emphasize that "the absence of necrosis in the control animal was considered to be an indispensable prerequisite to a positive reading." Eagleton and Baxter<sup>5</sup> reporting their modification of Zingher and Soletsky's method<sup>1</sup> in England say:

Readings are taken for the next 3 days. In the case of a virulent diphtheria bacillus the control animal shows nothing or a faint transient flush; the other animal shows a definite rose-red swelling which becomes more marked at each successive reading, and may terminate in slight necrosis.

Moreover, Force and Beattie,<sup>4</sup> who reported the use of intradermal tests for virulence of these organisms in "field-cultures" only a few months after Havens and Powell,<sup>3</sup> specifically state that "any lesions where sloughing occurs on both animals are not produced by diphtheria toxin." The lesion on the protected animal would usually be explained as due either to the presence of contaminating organisms, to allergy of some sort, or to faulty technic.

However, the cultures used in the tests being reported here had been plated and single, well isolated colonies picked to Loeffler's slants, and, in so far as morphology and cultural characteristics are concerned, appeared to be typical of *C. diphtheriae*.

The protected animal (No. 332) was kept under observation until its death on the 25th day after the tests were begun. It appeared to be in good health for 8 to 10 days at which time it ap-

peared sick, began to lose weight and later developed partial paralysis, and at the time of death weighed only 252 gm. as compared to its original weight of 487 gm.

All these conditions suggested that we were dealing with a phenomenon similar to that reported by Feierabend and Schubert<sup>7</sup> and Ivanić, Dimitrijević-Speth and Jovanović<sup>8</sup> and seemed to warrant further inquiry, because of the importance of missing the recognition of a very virulent strain of diphtheria organisms by calling such a reaction negative in routine work. Consequently the culture (No. 1177a) producing positive reactions on both test and control guinea pigs was replated but no contaminating organisms were found. From these plates four well isolated colonies were selected, and transferred to Loeffler's slants and to broth and incubated 24 hours.

At the same time another culture (strain No. 377) which had shown itself toxic in the first test without producing any evidence of reaction in the protected pig was grown in broth to be used with the above cultures in subsequent tests as a control. The morphology and fermentative behavior of these cultures were found to be the same as before.

With these 6 cultures the test was repeated with the result that all sub-cultures of No. 1177a again gave definite, although somewhat smaller, necrotic areas on both protected and control guinea pigs in 24 to 30 hours. The lesions increased in size to 0.5 cm. or more in diameter by the 2d day on both animals, while culture No. 377 gave a typical strong inflammatory reaction, with necrosis on the unprotected pig and none on the control. The test guinea pig died in about 48 hours, while the protected animal appeared to be still in good health at the end of 18 days. The lesions at the sites of injections on this animal persisted with-

out evidence of subsiding until about the 7th or 8th day. At the end of 16 days they are still clearly evident but appear to be healing rapidly, the animal showing no general ill effects.

According to the work of Feierabend and Schubert<sup>7</sup> the evident differences in intensity and outcome of the reactions in the first and second tests is to be explained on the basis of attenuation from growth on artificial mediums, as these workers and others<sup>8</sup> found that such organisms rapidly decrease in virulence when grown upon culture mediums.

The occurrence and persistence of lesions at the sites of injections in protected animals are explained by these investigators as due to the fact that there exists among the many strains of diphtheria bacilli some which, in addition to the power to produce a necrotizing toxin, possess a high degree of "invasiveness."

The work of both these groups of investigators would indicate that the latter properly accounts for the persistence of the organisms in the tissues at the sites of inoculation even in spite of the presence of antitoxin which is administered previously. They found that 200 units would not save the lives of guinea pigs receiving intradermal inoculation with strains of this character, and at autopsy the bacilli could be recovered from various internal organs, as well as from the nasal discharges. They believe that the protected animals in such cases die from the effects of toxin produced at these various focuses by bacilli which have invaded the tissues and survived the period of passive protection afforded by 200 units of antitoxin. They report the prevention of such an invasion and its consequent

fatal termination by the administration of an antibacterial serum, while the fatal result of such an infection was obviated by the use of 1,000 units of antitoxin.

Fermentation tests in Hiss serum water with filtered sugars, and phenol red as an indicator, were made previous to the virulence tests and all strains gave acid production in dextrose, maltose, dextrin, and galactose in 7 days, but not in lactose, sucrose and mannitol. However, strain No. 1177a and some of the others showed a slight but distinct change of the phenol red (from approximately pH 7.8 to pH 7.2) in saccharose in 24 and 48 hours which then reverted to alkaline and remained so.

These circumstances appear to warrant emphasizing the necessity for studying more carefully all intradermal virulence tests of suspected diphtheria cultures showing local reactions on both protected and unprotected pigs, before calling them negative, and attempting to explain them on some other premise. This would seem to be especially true in routine work involving "whole"- or "field-cultures," and in cases where subcutaneous virulence tests lead to death of both animals.

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3. Havens and Powell. *Am. J. Hyg.*, 2: 234, 1922.
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9. Bull and McKee. *Am. J. Hyg.*, 3: 103, 1923.

## VITAL STATISTICS

Smallpox from 1929 to 1931—The rough total figures for smallpox cases and deaths reported in the various continents show that in Africa, America, and Asia an increase took place from 1929 to 1930, while a marked fall occurred in 1931, the incidence during the first 6 months of this year being less than half of what it was during the corresponding period of 1930. In Europe, the situation has remained practically unchanged from 1929 to 1931.

The progress that has been made toward the eradication of smallpox since 1920, when nearly 200,000 cases were reported in the European countries and a few countries outside of Europe, is shown by comparative figures for this decade. In the 10 years, the number of cases was reduced to less than 16,000, of which 11,839 occurred in England and Wales alone. Most progress was made in the Union of Soviet Socialist Republics where vaccination was generalized after the revolution, and in Poland and Roumania. Considerable improvement took place also in Germany, where the number of cases reported fell gradually from 2,042 in 1920 to 2 in 1930; and in Italy, where the corresponding figures are 26,453 and 2. In Austria, Belgium, Bulgaria, Denmark, Estonia, Latvia, and Norway, no cases were reported in either 1929 or 1930, while one or two cases only occurred in Germany, Finland, Italy, the Netherlands, Sweden, and Switzerland during 1930. In the Netherlands, where smallpox is, as a rule, very rare, an outbreak of 703 cases imported into Rotterdam occurred in 1929. Vaccinations of the citizens reduced the incidence to 84 cases during the last 3 months of the year. Only 20 deaths

were noted throughout the period and no new case was reported after January 1930. The incidence of smallpox varies in France, from 1 to several hundreds, largely among foreign or colonial laborers.

In England and Wales, variola minor has increased more or less continuously since the end of the war (from 280 cases in 1920 to 14,767 in 1927, 10,968 in 1929 and 11,839 in 1930). The fatality rate is exceedingly small: 0.24 per cent in 1930. The geographical distribution of the disease has changed markedly in the last 4 years. Generally speaking, smallpox incidence has declined in northern England (Yorkshire) and has increased in the south and southeast, as well as in London. In 1929, a marked rise took place in its prevalence in London (1,903 cases against 296) and in Northampton, while a fall was observed in Glamorganshire and Monmouthshire. The 1930 Annual Report of the Chief Medical Officer of the Ministry of Health shows that, out of 3,518 patients under 15 years of age, 3,509 (99.8 per cent) were unvaccinated; from ages 15 to 40, out of 3,231 cases, 2,919 (90 per cent) were unvaccinated; and above the age of 40, out of 1,100 cases, only 262 (23.8 per cent) were unvaccinated. In Scotland, where smallpox had declined to a low level from 1922 to 1926, an abrupt rise occurred in 1927, more than 1,500 cases being reported that year and more than 1,400 the following year. A great improvement took place in 1929, when only 18 cases were reported, and in 1930, with 11 cases.

In Northern Africa smallpox is declining (Morocco, Algeria, Tunis) as vaccination progresses, the most remark-

able success being achieved in Egypt. In the latter country, smallpox claimed 2,677 cases with 544 deaths in 1926; in 1930, it caused only 14 cases without deaths. This is undoubtedly due to the vaccination campaign, begun at the end of 1925 and completed in 1926. Approximately 14,600,000 vaccinations were performed, thus reaching practically the whole population, except that in Cairo and Alexandria, where only 619,637 persons were vaccinated in 1930. In Central and Eastern Africa, the prevalence of smallpox, which has been increasing in recent years, continued its upward movement in 1929 and 1930. The observations made in Northern Rhodesia in 1928 are of particular interest. Apparently severe smallpox, alastrim (or amaas) and chicken pox, prevailed at the same time. Its low level in many instances resulted in the spread of the disease (4,035 cases in 1928, 3,855 in 1929 and 4,078 in 1930). In 1929, the smallpox fatality rate was 9.5 per cent—while the rate for alastrim was 7.8—a very small difference. From these indications it was concluded that for administrative purposes no distinction should be made between alastrim, amaas Kaffir-pox, and that every case should be treated as smallpox. The failure of vaccination to control the epidemic was due to inactive vaccine. In some districts, the lymph was inert through exposure to tropical heat, in others it did not give more than 30 per cent of "takes."

Apart from China, for the interior of which no statistical data are available, British India constitutes the most important focus of smallpox in Asia (more than 90 per cent of the cases reported). In 1929, the number of cases reported in India was slightly less than 150,000, and rose in 1930 to 215,204, the latter figure representing roughly the mean incidence of the disease for the three years 1926, 1927 and 1928. The numbers of deaths so far known for 1929

and 1930 are 34,393 and 48,860, but these figures are far from complete. When, after two or three years, revised mortality statistics are available, the provisional figures are more than doubled. Thus, the provisional figure for 1927, 51,776, became 118,197 when revised, and the 39,981 deaths in 1928 grew to 96,123. The high fatality rate of smallpox in India (above 50 per cent) shows clearly that variola major is prevalent there. In sharp contrast with the high prevalence of smallpox in India is its low incidence in Ceylon, where, in recent years, it has seldom attained 1 per 100,000. In Siam and Malaya the incidence of smallpox is comparatively low; and remarkably low in Java and in the Philippines. In the whole of French Indo-China, only 995 cases were reported during the first half of 1931, as against 3,502 during the corresponding period of 1930, but the fatality of the disease remained high (between 30 and 40 per cent). In Japan, the number of smallpox cases is practically negligible, while in Chosen it amounts to a few hundred every year and seems to be increasing. Throughout the Far East, it is the severe type of smallpox which is encountered.

In the Near East, the smallpox situation is, on the whole, favorable. The disease is practically non-existent in Palestine and Transjordan. It is disappearing in Syria; in Turkey a total of 561 cases was reported in 1929, 836 in 1930. The fatality rate varied from one local outbreak to another, ranging from 10 to 50 per cent, but averaging from 15 to 25 per cent. As in past years, New Zealand was free from smallpox in 1929 and 1930. Australia was also free but for 4 imported cases and 1 contact infected by them.

In Northern America the prevalence of a mild type of smallpox remains high. It has increased slowly during the last 5 years. In the United States, 42,282 cases were reported in 1929 and 46,712



in 1930. On the other hand, the fatality rate of the disease, which was already low, has declined still further from 1.8 per cent in 1925 to 0.4 per cent in 1929. In Canada, it was 0.4 per cent in 1929 and in 1930 there were no deaths at all. In both countries, an improvement occurred in 1931, the number of cases notified during the first half of the year being considerably lower than during the corresponding period of 1930—520 against 1,033 in Canada; 24,465 against 38,921 in the United States.

In the western and Rocky Mountain States smallpox is much more prevalent than in those east of the Mississippi. The highest incidence prevailed in South Dakota. Some New England States enjoy freedom from smallpox; such is also the case for Texas, where this freedom is quite remarkable because of the high prevalence of the disease in the adjacent states of Coahuila and Chihuahua, across the Mexican border where mortality rates of 61 and 48 per 100,000 respectively prevail. An idea of the prevalence of smallpox in Mexico may be derived from the number of deaths reported even though notification of cases for the whole of the country is lacking. These deaths numbered 5,497 in 1929 and 9,208 in 1930 (56.1 per 100,000), while the figures for the first months of 1931 show a further increase. There is no doubt that virulent smallpox constitutes a serious public health problem in Mexico.—League of Nations, *Month. Epidemiol. Rep.*, Oct. 15, 1931, pp. 385–396.

**Health Conditions in American Samoa**—The census of American Samoa, completed in March, 1930, gives an actual population of 9,768 persons, the majority of whom were full-blooded Samoans; the percentage of white persons in the population was so small as to be almost negligible. In 1930 there were 394 births and 177 deaths, result-

ing in a natural increase of 217, bringing the population to 9,985, the figure on which birth and death rates are computed. Based on this figure the birth rate in 1930 was 39.45 per 1,000 and the death rate 17.73, which rate is 3.66 per 1,000 lower than that for 1929.

The present system of collecting vital statistics in American Samoa is such as to make it unlikely that any births or deaths are not reported. This system became reliably operative May 1, 1928. A triple check is made on all births and deaths in the country. The pulenuu of each village as well as the district nurses are required to submit birth and death reports, and these in turn are forwarded to the central public health office where they are again checked for errors. It has become necessary during the year to send several village pulenuu before the secretary of native affairs for failure to report births and deaths. By taking this disciplinary action, the importance of these returns has impressed itself upon the village chiefs so effectively that omission of a birth or death report is practically impossible.

There were, in 1930, 41 infant deaths, giving an infant mortality rate for American Samoa of 104.07 per 1,000 live births. In 1929 there were 48 infant deaths, 7 more than in 1930. Of the 1930 deaths, slightly over half were due to pneumonia all forms (11 deaths) and acute infectious enterocolitis (11 deaths).

An analysis of the 177 deaths in American Samoa in 1930 shows that 47 per cent were due to the combined causes, tuberculosis, pneumonia, and influenza. Tuberculosis in its various forms caused 35 deaths, giving a death rate of 350 per 100,000. The death rate for the year 1929 was 422, which shows that the reduction for the year 1930 was appreciable. Tuberculosis has been the leading cause of death for several years, but pneumonia, with 40

deaths, led the list of causes this year, with a death rate of 400. Filariasis, which was the primary cause of 19 deaths (190 per 100,000), was the 3d most important cause of death.

An interesting departure from the death rates attributed to these causes in most countries is the record of no suicides, the low rate of 20.0 per 100,000 population, for cancer; and the rate of 120.0 for the entire group of diseases of the circulatory system.

No case of smallpox has occurred in this country in recent years—a record which is attributable, perhaps entirely and certainly in part, to a compulsory vaccination law, which is really effective. It is the practice to vaccinate children in all of the schools every year, one or more good scars in a child being considered evidence of immunity. During the calendar year 1930 there were 613 persons vaccinated. Acute infectious conjunctivitis was prevalent during the year, though there was a noticeable reduction, in the number of cases reported, from 3,361 in 1929 to 1,413 in 1930. Owing largely to the frequency of this disease, the percentage of blindness in the population is high, as shown by the Health Department Survey completed on April 1, 1930, which showed that 2.92 per cent of the total population are blind in one eye, and 1.07 totally blind. No cases of whooping cough, measles, diphtheria, or scarlet fever were reported in American Samoa during 1930; there were only 5 cases and no deaths from typhoid fever. Tuberculosis and acute infectious conjunctivitis are two of the primary health problems of the country, and these problems are receiving the concerted attention of health authorities.—*U. S. Nav. M. Bull.*, 30: 104–33 (Jan.), 1932.

**Suicide Statistics**—Part 1 (Medical) of the Registrar-General's Statistical Review of England and Wales for the year 1930 contains a table of

suicide statistics classified by age, sex and method. There were 5,056 suicides in the year, 3,527 among males and 1,529 among females. Four hundred of the male suicides were among men between the ages of 25 and 35, 548 between 35 and 45, 861 between 45 and 55, 869 between 55 and 65, 482 between 65 and 75, and 147 among men of 75 years and upward.

The figures for women do not follow quite the same progression. There were 250 female suicides among women between 25 and 35 years of age, 276 between 35 and 45, 383 between 45 and 55, 289 between 55 and 65, 167 between 65 and 75, and 37 among women from the age of 75 and upward.

The 1930 totals require, of course, to be coördinated with those of previous years and to be adjusted with statistics of the number of men and women of those decennial age groups. As they stand, the figures indicate that both men and women pass through a bad time between the ages of 45 and 55; in the following 10-year period men seem to be less resilient than women.

As to the method adopted, the figures for both sexes combined show 1,348 cases of coal-gas poisoning, 887 of drowning, 753 of hanging or strangulation, 613 of death by the use of cutting or piercing instruments, 262 of death by firearms, and 214 of railway suicides. In proportion to the other sex, more men than women hanged themselves, and more women than men resorted to gas poisoning. Only 8 women committed suicide with firearms, as against 254 men.

Cases of suicide by taking solid or liquid poisons or corrosive substances amounted to 715. Here the availability of the means is reflected by the detailed figures. Lysol—available, as recent litigation has shown, by purchase from automatic machines—was the means of 354 suicides among men and women, while opium, laudanum, and morphia

were the means used for only 5. The latter figure illustrates one valuable result of the restrictions imposed by the Dangerous Drugs Acts and Regulations.

Other means of suicide in this category were carbolic acid (56 cases), hydrochloric acid (53), potassium cyanide (43), prussic acid, hydrocyanic acid (29), oxalic acid (26), ammonia (19), and strychnine (4). Although there were very few "weed killer" cases of suicide, the figures in this category of poisonings may cause the public to consider how far it is desirable to permit the almost indiscriminate retailing of poisons by persons not specially trained in knowledge of the properties of the drugs they sell.—*Lancet*, 221: 1309 (Dec. 12), 1931.

**The Number of Infirm Persons in Germany**—The results of the census of infirm persons in Germany, taken in the year 1925–1926, were published recently. According to a report of these findings, the total number of blind persons in Germany at that time was 33,192 or 5.3 per 10,000 of population. The incidence of blindness among males was much higher than among females, partially because of the large number of men blinded during the war; but even after the deduction of the 2,307 war blind, the incidence among the males was still somewhat higher than among females, as has been the case in former statistical reports. Since the census of 1900, the number of blind persons has increased considerably.

The number of deaf-mutes was 31,-

670, showing a rate of 6 males and 5.1 females per 10,000 of population. In about half, the impairment was congenital. Of the deaf-mutes ages 7 to 20, 88 per cent had received instruction in institutions for the care of deaf-mutes; of those aged 20 to 40, 82 per cent had had such instruction, and of those above age 40, 64 per cent. Of the deaf-mutes above age 20, 82.2 per cent of the men were gainfully employed, mostly as tailors, shoemakers and cabinet makers; of the women, 36.5 per cent were employed chiefly as seamstresses. Of deaf persons who could not hear spoken words even with the aid of an ear trumpet, 8,755 were enumerated, 814 of whom were war injured. Their number was higher in the older age groups; 45 per cent were still gainfully employed: 66.4 per cent of the men and 21.5 per cent of the women. The number of persons with serious bodily infirmities was 276,467; 190,495 men, or 86.4 per 10,000 of population, and 85,972 women, or 29 per 10,000. Even after deducting the 82,972 war injured, the men were still in the majority, chiefly because of the hazards of industry, in the wider sense. The number of persons with slight bodily infirmities was 116,974; 89,784 males (among which were 45,007 war injured) and 27,190 females. The number of persons with mental impairment was 207,514; 105,374 men, including 6,090 war injured, or 37.9 per 10,000 of population, and 102,140 women, or 34.4 per 10,000.—*J. A. M. A.*, 98: 156 (Jan. 9), 1932.

# PUBLIC HEALTH ENGINEERING

## SURVEY OF CONNECTICUT'S SHORE BATHING WATERS\*

WARREN J. SCOTT

*Hartford, Conn.*

THE Connecticut State Department of Health has recently completed a fairly exhaustive survey of the sanitary condition of all of Connecticut's shore waters on Long Island Sound. For many years, and particularly in recent years, the department has received numerous inquiries as to the safety of sections of the shore for bathing. It has been impossible to give intelligent answers to these questions because of (1) the absence of complete data as to sewer outlets along the shore and (2) a dearth of information as to the bacteriological quality of Connecticut shore waters.

The survey was undertaken with the object of compiling sufficient information to enable the department to serve better the citizens of the state in their desire for specific information as to the sanitary condition of bathing areas and also to point out to municipal authorities and other interested persons the "danger spots" along the shore which are seriously affected by sewage pollution.

### POLLUTED BATHING WATERS

It is very difficult to obtain accurate epidemiological evidence as to just what sickness is caused by bathing in polluted

water. An exhaustive survey by the Committee on Bathing Places of the American Public Health Association was confined mostly to indoor swimming pools. The data obtained were not very conclusive. They report an epidemic of typhoid fever at a boys' camp from bathing in polluted water and many cases of eye, ear, nose and throat infections. Some of these latter infections might be due principally to lowering of resistance from chills.

Considerable interest has been evidenced of late by many public health workers in the possibilities of skin infections from bathing. Some minor outbreaks of skin disease among salt water bathers have come to the attention of this department. Unfortunately it is a fact that little is known as to the exact manner of spread of these skin infections—whether the infection has been spread on land rather than in the water or whether the water has acted as a vehicle of transmission from one bather to another, or whether the source of infection has been sewage present in the water.

### METHOD OF THE SURVEY

Maps of the Connecticut shore were prepared to indicate the locations of sewer outlets along the entire Long Island shore. All major outlets were included in the survey although all individual house outlets may not have been spotted. Data were obtained as

\* Adapted from Connecticut Health Bulletin, Vol. 45, No. 12.

This is a contribution of the Committee on Bathing Places of the Public Health Engineering Section of the A. P. H. A.

to the population contributing sewage and other pertinent facts about the sewers. Local health officers coöperated in furnishing considerable information along this line.

Nine hundred and twenty-two sampling stations were chosen at intervals of approximately 1,000 feet along the entire Long Island shore in Connecticut, including areas used for bathing and intervening areas.

Four samples for bacteriological analysis were collected at each station to represent conditions at 4 different stages of tide. The samples were taken as nearly as possible at high, low, one-half ebb, and one-half flood tides. The samples were taken in almost every case from a boat in from 2 to 6 feet of water. They were obtained by dipping a sterilized bottle just below the water surface.

Samples were examined only for the presence of organisms of the coli-aerogenes group. The lactose broth method was employed, using 4 dilutions of the sample for the most part, with the use of 5 dilutions where any serious pollution was suspected. Dilutions were in geometric progression from 10 c.c. to .01 or .001 c.c. Partial confirmation on Endo agar was the limit to which the tests were carried.

#### EFFECT OF WIND

Although records were made of the direction of the wind, no attempt was made to collect samples under different conditions of wind. It is believed that the run of tides is the principal factor to be taken into account in the travel of pollution along the Connecticut shore but minor discrepancies would undoubtedly exist with certain conditions of wind. Of course, too, the tidal movements are frequently influenced by strong winds. In the survey classification described later, nearness of polluting influences and possibilities of shifting direction of pollution travel with different wind conditions were taken into account.

#### EFFECT OF BATHERS UPON BACTERIAL POLLUTION

In attempting to evaluate the analytical results obtained in the course of the Connecticut survey, one of the uncertain factors was believed to be the possible effect on the results caused by bathers in the water at the time of collection of samples. Incidentally, notes were made as to the relative amounts of bathing where samples were collected along beach areas during the survey. It is an unfortunate circumstance in Connecticut that most of our densely populated bathing waters are conveniently located outside of the harbors of our large cities and so are subject to effects of distant sewage pollution. This introduces complications in interpreting analytical studies as to effects of dense bathing.

In 1930, some studies were made at Hammonasset Beach where samples were collected in the midst of some large week-end crowds, and in 1931, similar studies were made at Sound View with crowded bathing conditions. Both areas were chosen because of their relative freedom from any serious outside polluting influences. Bacterial results on the waters sampled with dense bathing were compared with the same waters after tidal changes and with little or no bathing.

While there was found to be a slight increase in the bacterial pollution with dense bathing, the difference was not very significant and there seemed to be little correlation between the quantity of bacterial pollution and the number of bathers. As a result of our studies, we do not believe that the pollution introduced by bathers seriously affects our classification of bacterial results although in some of the country's large, thickly populated bathing areas, different conclusions would undoubtedly be reached. Bacterial pollution by bathers is evidenced by studies of small swimming pools but along the shore the

diluting influences are great and tend to minimize the effect of pollution of the shore waters by bathers.

#### COMPUTATIONS OF BACTERIAL POLLUTION

The values for *B. Coli* content were computed by assuming 1 *B. Coli* originally present in the greatest dilution to give a positive test. For example, positive in 10 c.c. and 1 c.c. and negative in 0.1 and 0.01 c.c. is called 100 *B. Coli* per 100 c.c. If it is desired to express the results as the so-called most probable number of *B. Coli* per 100 c.c., the above figure must be multiplied by the factor 2.3. This would be approximately correct except where so-called anomalous results are obtained, such as a sample showing positive in 10 c.c., negative in 1 c.c., and positive in 0.1 c.c. There were comparatively few such cases and these were treated by recessing to the next less dilution, similar to the process used in scoring oysters. The method used has the advantage of simplicity and furnishes a satisfactory method for comparing results.

The final result for each station was obtained by averaging the 4 computed *B. Coli* counts which seemed as satisfactory as any method. It is realized that undue weight is given in this method to 1 poor result but on the other hand, it emphasizes the occurrence of chance pollution which may be dangerous.

#### BACTERIAL STANDARDS FOR BATHING WATERS

The classification of the safety of bathing waters on the basis of analytical results is complicated by the fact that no accepted standards exist as a basis for such classification. In public health work we have gradually come to adopt certain standards, usually proposed by certain leading scientists and perhaps later changed as a result of experience until these standards are found to be

possible to meet and to be sufficiently stringent to avoid trouble as shown by epidemiological evidence. Our standards for drinking water supplies and milk have been developed in this way. Similarly, bacterial standards for swimming pool waters subject to continuous or intermittent disinfection have been worked out.

In considering drinking water and indoor swimming pools as compared to salt water beaches and large inland streams, there is the difference that ready methods of chlorination or filtration are available in the former case whereas we are dependent on dilution and natural purification in the latter case. There is another distinction which should be borne in mind between the presence of *B. Coli* in salt water beaches or inland streams and in indoor swimming pools. The source of water supply for an indoor swimming pool is either a public water supply or a private water supply relatively free from *B. Coli*. Therefore, *B. Coli* found in indoor swimming pools must be regarded as of human origin. *B. Coli* in the waters of inland streams may be of animal origin and of no great sanitary significance. The same may be true to a lesser extent of harbors receiving a large flow of fresh water from land subject to contamination from animal sources—cultivated land, manure piles, etc.

#### BACTERIAL CLASSIFICATION

It has already been stated that no acceptable analytical classification of bathing waters has ever been made, nor is any arbitrary set of standards entirely satisfactory. It was originally attempted in these studies to set up tentative analytical classifications such as Good, Fair, Doubtful, Poor, and Very Poor. This was later abandoned because of the belief that the classifications were on too arbitrary a basis and because of the possibilities of misinterpretation of results. Instead, a relative

classification of results was attempted. This classification is as follows:

TABLE I

Average *B. Coli* per 100 c.c.

Class A +	0-10
Class A —	11-50
Class B	51-500
Class C	501-1,000
Class D	Over 1,000

The reason for the division of Class A into 2 parts is that it was desired to *work out a basis of comparison* with the classifications made on the basis of the sanitary survey, as described later, but, whereas it was felt that a line of demarcation could be drawn through the analytical results in this highest class, no such distinction could properly be made in the sanitary survey classification which groups the areas as A, B, C, and D. Of course, if desired, the distinction could be dropped and Class A + and Class A — could be grouped together as Class A.

A rough total of the entire length of Connecticut shore of Long Island included in this study is 181.3 miles. Following is a tabulation of the mileages and percentages of the total falling into each of the classifications on the basis of analytical results:

TABLE II

	Mileage	Percentage
Class A +	72.2	39.8
Class A —	43.8	24.2
Class B	33.7	18.6
Class C	18.5	10.2
Class D	13.1	7.2
Total	181.3	100.0

Reference is made to the manner of choosing sections of shore and the averaging of the *B. Coli* results at the included stations. This is given under the next sub-heading.

## ESTABLISHMENT OF SHORE SECTIONS

Principally on the basis of the sanitary survey data, but also with some regard to the analytical results, the shore was divided into sections varying in length from 1,000 feet to 1 or more miles. These shore sections were then classified according to the sanitary survey data and also according to the analytical data.

It is important to note that the classification of these sections both on the basis of the analytical data and also of the sanitary survey is the end point of this study.

The analytical classification of any particular section is made by averaging the results of the different individual stations included. The results for each station, as before mentioned, are secured by averaging the *B. Coli* counts for the 4 tidal stages. The sanitary survey classification, of course, was purely a matter of judgment by the engineers employed on the work.

## SANITARY SURVEY CLASSIFICATION

As has been mentioned, a sanitary survey classification of the shore areas was made. The sanitary survey included the location of sewer outlets along the entire shore with the accumulation of data as to the flows of sewage and contributing population. In connection with studies of shellfish areas in Greenwich, Norwalk, New Haven, and Bridgeport harbors, float studies were carried out by the State Department of Health in 1927 and 1928 and the results of these studies were available in considering bathing waters in these localities.

The sanitary survey classifications are: Classes A, B, C, and D. No A + or A — is included in the sanitary survey classification as this would seem to give a false impression of accuracy. Class A represents good conditions, as disclosed by the sanitary survey; Class

D represents very poor conditions on the same basis; Class B might be considered to represent fair to doubtful conditions; and Class C would include doubtful to poor conditions. The 2 intermediate classes are somewhat difficult of definition.

Following is a tabulation of the mileages and the percentages of the total, falling into each of the classifications on the basis of the sanitary survey:

TABLE III

	Mileage	Percentage
Class A	69.3	38.2
Class B	76.6	42.2
Class C	23 0	12.7
Class D	12.4	6.9
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Total	181.3	100.0

CORRELATION BETWEEN BACTERIAL AND  
SANITARY SURVEY CLASSIFICATIONS

Before proceeding to a discussion of the specific sections of the shore, it is of interest to present a tabulation showing the correlation between the classifications on the basis of analyses and the classifications on the basis of the sanitary survey information.

TABLE IV

Bacterial Classification	Sanitary Survey	Per Cent of Total
Class A +	Class A	36.3
Class A —	Class A	1.2
Class B	Class B	11.7
Class C	Class C	6.7
Class D	Class D	6.2
		<hr/>
		62.1

This table is of great interest in that a very close correlation is shown. The summary of the above percentages indicates that 62.1 per cent of the area studied showed an exact correlation.

In Table V are presented the data showing the variations between the bacterial and sanitary survey classifications

in the 37.9 per cent of the area where exact correlation was not found. A study of this table discloses that 36.7 per cent of the total area showed a difference of only 1 class in the 2 classifications.

The remaining portion of the total is but 1.2 per cent and this did not show a close relationship. In some sections falling in the last group, unexpectedly good bacterial results were secured in areas looking very questionable on the basis of the sanitary survey, and, conversely, poor bacterial results were secured in areas apparently free from serious pollution. The former discrepancy might be due to the laws of chance in sampling or to certain tidal movements or other reasons; the latter might be caused by some chance pollution by boats or due to concentration of surface wash entering the area from cultivated land.

TABLE V

Bacterial Classification	Sanitary Survey	Per Cent of Total
Class B	Class A	0.7
Class C	Class B	3.1
Class D	Class B	*1.1
Class A +	Class B	3.5
Class A —	Class B	22.9
Class B	Class C	6.0
Class C	Class D	0.5
Class B	Class D	*0.1
		<hr/>

\* Little correlation shown. 37.9

GRAPHICAL AND DETAILED PRESENTATION  
OF DATA

Office reports furnish detailed discussions of the conditions along various sections of the shore with a detailed tabulation of the areas.

For office use, the data have also been plotted on U. S. Coast and Geodetic Survey charts. Information concerning these data is available in the case of inquiries addressed to the State Department of Health.



## CONCLUSIONS

1. It is believed that the study of Connecticut shore waters has given a very satisfactory basis for classifying the sanitary condition of the various sections of the shore. While no sufficient basis exists for any system of absolute classification, such as "Good," "Fair," etc., a relative classification is possible and enough detailed information is available from the analytical results and the sanitary survey to enable the Department to answer intelligently most inquiries as to bathing areas along Long Island Sound. A very high degree of correlation is shown between the relative classifications of the analytical results used in this study and the classifications decided upon on the basis of the sanitary survey (or judgment).

2. Many miles of Connecticut shore were found to be in excellent sanitary condition, testifying to the great recreational asset the state has in her salt water bathing beaches.

3. The effect of harbor pollution in Connecticut is rapidly dissipated by dilution available in Long Island Sound so that the sewage from our cities and towns is not a factor, to any great extent, in polluting the main body of water in the Sound. The principal considerations are as to the harbor waters of themselves and waters in close proximity.

4. The harbors of many of our cities and towns are highly polluted and improvements are imperative. The effect of this harbor pollution exists also in waters in close proximity to our harbors. Unfortunately, it is these waters in and near our harbors that are frequently developed extensively for bathing because of their convenient nearness to centers of urban population. Some of our bathing beaches at such locations are close to the border line of safety. The salutary effects of

sewage treatment at these points are exemplified by the effects noted where treatment exists. The situation does not call for hysteria or undue alarm but a steady program of improvement along the lines now aimed at by state and municipal authorities should be followed.

5. The Housatonic and Connecticut Rivers, while subject to a large amount of pollution, undergo a great deal of self-purification before they enter the Sound, and the dilution available at their mouths is great enough to minimize the influence of pollution from these rivers so that they are no appreciable factor either in the pollution of much of the shore line or the main body of water in the Sound. This does not mean, however, that these rivers should not be improved in condition both with respect to certain tributaries and the rivers themselves where local and cumulative pollution is objectionable.

6. Numerous individual cases of local pollution were disclosed by the survey. Many of these pollution sources are of small magnitude but it is frequently the case that relatively small amounts of pollution in close proximity to bathing areas are more dangerous than far greater amounts at a greater distance. Coöperation of the public and better appreciation of desirable sanitary standards should gradually bring about improvements. The day is going by when the average citizen is content to build a house on the shore, pipe the household sewage to the water in front of the house, and then bathe in the water.

7. Increasing sewage pollution of our rivers and harbors will result in conditions more threatening to the safety of bathing beaches and shellfish areas in their proximity than may be shown by present studies, if not offset by installation of sewage treatment plants.

## FOOD AND NUTRITION

**Composition of Rabbit Meat—**These tests were made in the Bureau of Animal Industry of the U. S. Department of Agriculture. Four normal healthy domestic rabbits ranging in age from 10 months to 1½ years were used in the experiment. The animals were slaughtered and dressed in the regular way. The heart, liver, and kidneys were removed and weighed separately; the meat was then stripped from the bones and each weighed separately. The meat was prepared and analyzed in accordance with the official method of the Association of Official Agricultural Chemists. The composition of the meat was found to be similar to that of poultry, the content of moisture and protein being relatively high and that of fat rather low.—H. R. McMillan, *J. Home Econ.*, 23: 1149 (Dec.), 1931.

**Irradiated Milk: the Energy Requirements for Antirachitic Activation—**The radiation used in these experiments was obtained from various types of carbon arcs and mercury arcs operated under known conditions and with known energy. Fluid milk containing 1.2 per cent of butterfat was used, and the irradiation was carried out in 1,000 lb. lots. The milk was exposed to the radiation in the form of a moving film which received the rays at constantly changing cycles of incidence, varying from 0 to 90°. The periods of exposure were 8, 16, 32, and 48 seconds. The milk was immediately dried by the Just process and hermetically sealed in inert gas.

White rats, 28–30 days of age, were fed on the Steenbock and Black (*J. Biol. Chem.*, 64: 263, 1925) rachitogenic Ration 2965 for 21 days followed by 10 days of supplemental feeding of

10 c.c. daily of the reconstituted dry milk. At the end of this period the line test and bone ash determinations were made. The results show that substantially the maximum antirachitic potency which could be imparted to milk was brought about with the first few seconds of exposure. The objectionable flavor and odor so often reported as developing in milk after exposure to ultra-violet rays were not noticed.

Clinical tests were also made on 11 colored infants during the winter months. The infants were fully protected from rickets. The milk also showed definite curative value in a number of cases as shown by the marked healing in Roentgenograms.—G. C. Supplee, M. J. Dorcas, and Alfred F. Hess, *J. Biol. Chem.*, 94: 749 (Jan.), 1932.

**Protein Intake and Basal Metabolism of College Women—**Eighty-five women students, ranging in age from 19 to 37 years, 85 per cent being between 19 and 24 years of age, were studied in order to determine the habits of protein consumption and the possible relationship between protein intake and basal metabolic rate. The average protein intake was 0.94 gm. per kg. body weight, while the average protein intake of male students was previously shown to be slightly more than 1 gm. per kg. body weight (*Am. J. Physiol.*, 82: 577, 1927; 89: 403, 1929, and *J. Biol. Chem.*, 61: 109, 1924). The average 24-hour urinary nitrogen excretion for the group was 7.69 gm. It is suggested that the lower protein intake of women may be in part responsible for the fact that their basal metabolic rate is lower than that of men.—Rossleene Arnold Hetler, *J. Nutrition*, 5: 69 (Jan.), 1932.

**Staphylococcus Food Poisoning—**

The discovery of a new type of food poisoning due to the toxic products of staphylococci seems to explain a certain number of outbreaks in which no *Salmonella* bacilli are found.

In 6 recorded instances, staphylococci are quite well established as the cause of food poisoning. In 4 of these instances, food epidemiologically implicated contained large numbers of staphylococci. Pure cultures of these staphylococci yielded broth filtrates which, when swallowed in small amounts (2 to 10 c.c.) by human volunteers, produced symptoms noted in original patients. There are also 2 recorded instances in which staphylococci growing in milk have caused illness when swallowed by human beings. In 1 of the above cited instances, staphylococci of the albus type were implicated, yellow staphylococci of the aureus type being concerned in the other 5 instances. Other instances are cited in which staphylococci were the probable but not proven causative agents.

Differences in food poisoning due to staphylococci and that due to members of the *Salmonella* group may be found in the incubation period, mortality, and the amount of sterile broth filtrate which produces characteristic symptoms in human volunteers. In staphylococcus food poisoning the symptoms usually occur within 2 to 4 hours; no deaths have occurred in any of the above mentioned outbreaks or in approximately 100 human volunteers who have become ill after swallowing sterile toxic filtrates, and amounts as small as 2 c.c. of sterile broth filtrates of staphylococci will produce characteristic symptoms. In *Salmonella* food poisoning, the incubation period averages from 6 to 12 hours, with an estimated mortality of about 1 to 2 per cent, and *Salmonella* filtrates have been swallowed by human volunteers in amounts as large as 145 c.c. without producing characteristic symptoms.

Staphylococci concerned in food poisoning do not seem to differ culturally from the common and widely distributed members of this group. Toxin producing strains of both albus and aureus varieties have been found. Some strains may produce a toxin at one time and not at another. Their source is not known with any degree of certainty because of their wide distribution.

Further study of the properties of the toxic substance is in progress. There is no evidence of a true immunity to staphylococcus toxin although there appears to be some degree of tolerance. Repeated attacks may be produced in a volunteer by successive feeding. Boiling for 30 minutes does not destroy but perhaps weakens the toxin. Chlorination and storage at low temperatures do not destroy the toxic quality of broth filtrates.—Edwin O. Jordan, *J. A. M. A.*, 97: 1704 (Dec. 5), 1931.

**Does Freezing Kill Cl. Botulinum**

**Spores?—**The production and marketing of frozen vegetables and fruits without heat sterilization has raised the question as to whether or not there is a possibility of botulinus poisoning arising from the consumption of such products which had been improperly handled. Two general methods are used in the freezing of food products, "quick" freezing in which the food material is solidified in a comparatively short time by exposure to very low temperatures, ranging from  $-50^{\circ}$  to  $-85^{\circ}$  F., and "slow" freezing in which the packaged materials are placed in a refrigerated room and solidified only after several hours of exposure. Freezing the spores with solid carbon dioxide ice resembles the treatment in "quick" freezing, and exposure in a cold room is comparable with "slow" freezing. The effect of freezing upon the botulinus spores is obviously of first importance, and studies have been made in which the conditions of experimentation have

resembled those existing in commercial practice. Dried *Cl. botulinum* spores (Type B), suspended and heated in a Sørensen buffer solution of pH 6.9, have been frozen with solid carbon dioxide ice, defrosted at intervals, and the total numbers of living spores as well as the presence of toxin determined. There was no reduction in the number of living spores, neither when defrosted and examined immediately after being frozen, nor when they have been frozen for 9 days and then examined. Subcutaneous injections into guinea pigs showed that no toxin had been liberated from the spores by the freezing.

A suspension of dried spores of the same botulinus culture was divided among several test tubes and frozen by exposure in a refrigerated room held at approximately 20° F. Twenty-four to 36 hours were required for the suspensions to be thoroughly solidified. Examination of portions 1 day after being frozen and periodically to 11 weeks showed that there was neither a reduction in the total numbers of living spores, nor was toxin liberated.—Lawrence H. James, Abstr., *J. Bact.*, 23: 47 (Jan.), 1932.

**A Study of Escherichia Coli in Ice Cream**—This study was undertaken primarily to see if *E. coli* would survive pasteurizing temperatures in ice cream mix. Seventy-three samples of ice cream were examined and it was found that they contained from 200 to 157,000 bacteria per c.c. Forty-five samples produced gas and 21 produced a metallic sheen on eosin-methylene-blue agar. The majority of the samples were slow acid-producers in litmus milk. A Gram-positive organism was found that produced a metallic sheen on eosin-methylene-blue agar. When incubated in gentian-violet-lactose-peptone bile in combination with *Aerobacter aerogenes* and streaked on eosin-methylene-blue agar, it gave the partially confirmed

tests for *E. coli*. This organism is still being studied.

Two *E. coli* cultures survived 62.8° C. in milk; 13 cultures survived 62.8° C. in ice cream mix. At 65.5° C. 1 culture survived 3 trials out of 4, and at 68.3° C. the same culture survived 1 out of 4 heatings.

Sugar, gelatine, serum solids, and fat showed some protective action for bacteria in the order named. Heat-resistant *E. coli* showed a slight pathogenicity when given orally to guinea pigs. Dominick and Lauter liquid media seemed to be more satisfactory than Salle's.—J. Venceslav Anzulovic, Abstr. *J. Bact.*, 23: 56 (Jan.), 1932.

**Epidemics of Septic Sore Throat of Milk Origin; Present Status of Bacteriology and Epidemiology**—From studies made at the University of Illinois, College of Medicine, of septic sore throat, the following points seem to be established:

1. The epidemics are sudden, sharp and severe, indicating a massive dosage of the infecting agent.
2. The sick are largely limited to users of 1 milk supply. There are relatively few contact infections.
3. Epidemics rapidly recede when the infected milk supply is cut off or the milk pasteurized.
4. Usually 1 cow is found with an udder infected with an encapsulated hemolytic streptococcus. This organism produces large mucoid, watery, spreading colonies growing especially well on ascites blood agar. These organisms were observed in the Chicago epidemic of 1910–1911 and have become known since then as the *S. epidemicus*.
5. Experiments indicate that when these streptococci are implanted in the cow's teat, they will rapidly ascend the duct and localize in the udder, causing mastitis. They may continue there for long periods thus giving rise to the carrier state. The udder may or may not reveal gross physical changes.
6. Similar encapsulated streptococci are uncommon in the throats of normal persons (less than 1 per cent) but more common in infected throats (12 per cent of tonsils). Sporadic cases of septic sore throat indistinguishable from epidemic cases are occasion-

ally seen. From such throats encapsulated streptococci of the epidemicus type may be found.

7. These encapsulated streptococci produce toxins which give rise in animals to specific neutralizing antiserum. The toxins cause specific skin reactions in susceptible persons (differing from scarlet fever toxin). A study of several strains indicates that they are heterogeneous by the agglutination test. Agglutination tests however are often unreliable for encapsulated organisms. We have not as yet compared the toxin-antitoxin properties of a number of different strains.

8. From a study of many epidemics of septic sore throat, it appears that not infrequently cases of scarlet fever and erysipelas occur as complications. There is marked variation in this respect. At times scarlet fever and skin rashes are relatively common. Again they may be rare or absent and erysipelas relatively common. On the other hand it is well known that sore throat without rash

is common during epidemics of scarlet fever.

9. Strains of streptococci classed as scarlet fever or erysipelas organisms on the basis of skin and other tests at times develop capsules and grow quite like strains of *S. epidemicus*. Such strains may be the cause of milk-borne scarlet fever. The variability in these clinical manifestations together with the variability in properties of streptococci from epidemics of septic sore throat, scarlet fever and erysipelas suggest the possibility of a variable toxigenic and serologic property.

10. A study of the world distribution of epidemics of septic sore throat of milk origin reveals 3 general localities: namely, (a) Great Britain, (b) Scandinavia and Denmark, and (c) United States and Canada. In other parts of the world the methods of treating milk supplies may explain their freedom from infections.

—D. J. Davis, Abstr., *J. Bact.*, 23: 87 (Jan.), 1932.

## INDUSTRIAL HYGIENE

**Occupational Disease Clinic Established**—A weekly clinic for the benefit of labor and industry involved in occupational disease hazards has been established at the research hospital of the medical college of the University of Illinois in Chicago. Clinics will be held each Saturday from 12 noon to 2 p.m. The work of the clinic will be limited strictly to diagnosis and consultation. No treatments will be given.

Any person in Illinois of impaired health who has been exposed to any occupational disease hazard will be accepted at the clinic for examination. Occupations which involve these risks include painting, stone cutting, battery manufacturing and repairing, garage work, zinc smelting, varnishing, printing, lead mining, enameling and various others. Hospital facilities will be pro-

vided for those patients who need it.

The object of the clinic is primarily to make more easily available the special medical knowledge and facilities needed for the control and prevention of occupational diseases. Incidentally it provides a teaching center for medical students and for physicians who wish to specialize in industrial medicine.

The plan of operating the clinic is to work in close coöperation with industrial physicians and with the medical profession. It is anticipated that a diagnosis of lead poisoning, for example, or silicosis in any patient will lead not to appropriate treatment of the patient alone but to the application in the place of employment of measures calculated to minimize the risk to other employees.

The establishment of the clinic is the second important step taken re-

cently by the State Department of Public Health in its industrial hygiene program. A few months ago the McCord test for detecting the onset of lead poisoning was added to the diagnostic laboratory procedure provided by the Department.—*Illinois Health Messenger*, 3, 22 (Nov. 15), 1931.

E. R. H.

**Coal Miners and Tuberculosis**—Coal miners, although so constantly exposed to coal dust and stone dust, are notoriously less liable to pulmonary tuberculosis than workers in other dusty trades, and Haldane has pointed out that this situation has existed for generations. "It is difficult to resist the conclusion that in some way the inhalation of dust in coal mines tends to prevent phthisis."

The author suggests that this antituberculous property may depend upon the well known adsorptive power of coal dust and not upon any antiseptic action. Recent observations by the author and Dr. Weatherall have proved that coal dust in fine division can adsorb and inactivate tuberculin solutions to a marked extent.

When it is recalled that the lungs of silicotic and anthracotic coal miners may contain over one hundred grams of coal dust, as shown by Cummins and Sladden in their recent work, it will be readily conceded that the available adsorption potential of carbonaceous matter in silico-anthracotic lung tissues may be very great.

Accumulated coal dust in the lungs is not, however, an unmixed blessing. It leads to fibrosis and devascularization and sometimes to colloquative changes and even cavity formation so that emphysema develops with serious interference with respiration. Most old coal miners are dyspneic, although many work to a great age "short of breath" and suffering from copious sputum, cough, and sometimes asthmatic trouble.

While the collier's death rate from tuberculosis is relatively low, his death rate from "bronchitis" is very high. Possibly the word "bronchitis" is not well chosen. Coal miners possibly die from dyspnea instead of merely being dyspneic. Certain it is that stone dust and coal dust combined produce in time a state in which the breathing efficiency of the lungs is seriously compromised. The attitude of complacency commonly assumed toward the risks run by coal miners from exposure to mixed dusts is unjustifiable. Coal mining involves a definite risk of pneumoconiosis.

Two valuable lines of prophylaxis are open to further investigation: A closer study of the stone dust used to diminish the danger of explosions, and the reduction of dust from hard stone during the use of compressed air drills. The success attending the use of respirators against lethal gases during the late war encourages the hope that the risks in dusty industries may be as efficiently solved.—S. Lyle Cummins, *J. State Med.*, XXXIX, 9: 526-536 (Sept.), 1931.

E. R. H.

**International Conference on Industrial Accidents and Diseases**—This Conference held at Geneva, August 3-8, 1931, was attended by 450 delegates from many countries, including Australia, Japan, the United States, and South Africa.

The conference divided into 2 sections, for accidents and diseases respectively. The agenda included the following subjects:

1. Cutaneous affections viewed from an industrial standpoint
2. The influence of the previous state of health in regard to sequelae of industrial accidents and diseases, discussed by joint meetings of both sections
3. Traumatic lesions of the blood vessels (forms of arteritis and thrombophlebitis), and later sequelae and adaptation in cases of trauma

matic lesions of the spine, discussed by the accidents section

4. Pathology of workers in the cement and artificial stone industries

5. Receptivity of the system to toxic substances utilised in industry

6. Fatigue, discussed by the diseases section

More than 250 papers were submitted. An exhibition of photographic and radiographic slides, casts, and other graphic material was held in Geneva University.

It was decided to hold the next Congress at Brussels, 1935.—International Labour Office (League of Nations), *Indust. & Labour Inf.*, XXXIX, 10: 331 (Sept. 7), 1931. E. R. H.

**Health of Workers in the Engineering Industry**—Among the non-occupational health factors there are the general ones of good trade, regular employment, and decent earnings; the personal factor of physical health; and the environmental factor of home and its surroundings.

Among the occupational health factors characteristic of engineering are *sandblasting* in which oftentimes shot-blasting might be substituted with great decrease of hazard; *chromium plating* in which respirators and rubber gloves, aprons, etc., should be used; *cellulose spraying* in which the "pear-drop" odor of volatile amyl compounds and certain benzene derivatives occur; *oil dermatitis and boils* in which it is considered that a suitable bactericidal fluid for treatment of oil has been evolved; the *accident* relations especially associated with factors of temperature and humidity and the necessity for safety officers; and *fatigue* occasioned by excessive physical exertion or by monotony of work.

Rationalization in industry is a modern tendency; more and more work is being delegated to the machine. At the same time the machine and its tools should be constructed with regard to the physical comfort of the future op-

erative. Thus, the prevention of fatigue as well as of accidents depends upon the maintenance of psychological and physiological normality.—Arthur Massey, M.D., D.P.H. (Coventry), *J. State Med.*, 39: 10, 569-576 (Oct.), 1931. E. R. H.

**The Effect of Rhythm and Reverie on the Machine Worker**—Machine workers whose jobs permit the establishment of rhythmical bodily motions soon experience a "mind freedom," which permits protracted reveries.

Such reveries are often pleasurable mental excursions which leave the worker in an emotionally quiescent state. The triple combination of (a) response to measured cadence, (b) day dreaming, and (c) earning one's living accounts for great masses of human beings remaining contented year after year at work which requires only muscular attention. Bodily response to rhythm, and mental tendency to day dream, are among the oldest habits of man. When a human being engages in age-old customs, a sense of satisfaction usually accompanies such acts.

Machine made reveries may consist of nothing more than idle and fanciful musings or even morbid worries. On the other hand, they may be meditations of great merit. Samuel Gompers and Michael Pupin are examples of men who planned great things while they were still uneducated routine workers and later in life made imperishable contributions in their respective fields. Each in his autobiography clearly traces such deeds to the "mind freedom" permitted by certain work in their early lives. A number of other cases of reveries on the job are cited, among them being the experiences of the investigator himself while a conveyor worker at the Ford Motor Company plant.

The paper concludes with the suggestion of further research into the pos-

sibility of directing the mind habits of rhythmical workers into more generally constructive channels.—Stanley B. Matheson, *Ohio J. Sci.*, XXXI, 5: 425 (Sept.). 1931. E. R. H.

**Annual Report of the Commissioner of Industrial Alcohol**—This mimeographed statement for the press issued by the Bureau of Industrial Alcohol, U. S. Treasury Department, provides data concerning the production of alcohol, the manufacture of synthetic alcohol from ethylene during the past year on a commercial basis, the amount of alcohol and rum (149,303,438 proof gallons) withdrawn from bond for denaturation, and a table of the number of wine gallons of alcohol used in some 40 different manufacturing processes during the previous fiscal year. The number of permits in force as of June 30, 1931, was 177,833 divided between numerous manufacturing, business, educational, and medicinal usages (classified).

Modification of formulas for specially denatured alcohol have taken place following considerable research which has resulted in reducing to a minimum the illegal distillation of alcohol preparations for the purpose of obtaining potable alcohol. Weaker formulas were eliminated. On January 1, 1931, the bureau eliminated the use of wood alcohol in completely denatured alcohol; revoked completely denatured alcohol formula No. 1; and revised completely denatured alcohol formula No. 5 by replacing wood alcohol with *alcotale*, a new denaturant developed in the laboratory at Washington after several months of intensive research work. With the addition of *isopropanol* and *alpha terpineol* as additional denaturants to formula No. 5 and the addition of *alcohol*, the alcohol is rendered totally unfit for use as a beverage and impracticable for illegal recovery of potable alcohol.

The report mentions the extent of

the use of medicinal whiskey, rum and brandy products, distilled spirits, and wine, with a word about the issuance of basic permits which have now been standardized, and the control of plant operations. E. R. H.

**Tanning**—The extent and scope of the tanning industry in the U. S. and in the provinces of Canada is briefly summarized, after which conditions in 5 individual plants which were observed in field investigations are discussed.

A description follows of the methods of tanning, from the preparation of hides to dyeing and finishing. The general consideration of hazards, prepared by Dr. Carey P. McCord, takes up the different operations in order and the outstanding hazards. Among these latter are discussed synthetic tannings, anthrax, hydrogen sulphide, dyeing and coating, odors, pyogenic infections, and mechanical hazards.

As is usual with this series of reports there is a complete summary associating each particular occupation with its hazards, the list in this case involving some 100 different jobs.—Retail Credit Company, Atlanta, Ga., *Indust. Rep.*, VI, 12: 145-161 (Dec.), 1931.

E. R. H.

**A Survey of State Legislation of Interest to Physicians Since January 1, 1931. Changes in Present Compensation Laws**—An Ohio bill was passed adding to the list of compensable occupational diseases: manganese dioxide poisoning, radium poisoning, tenosynovitis and prepatellar bursitis, chrome ulceration of the skin or nasal passages, potassium cyanide poisoning and sulphur dioxide poisoning. A New Jersey law designates as "radium poisoning" that occupational disease hitherto listed as "radium necrosis" in the New Jersey act. Citation is made of a number of bills in various states which failed of enactment.—William C.



Woodward and Thomas V. McDavitt,  
*A. M. A. Bull.*, 26, 8: 202 (Nov.), 1931.

E. R. H.

**Functions of an Industrial Eye Clinic**—The benefits gained by industry through eyesight of employees are pointed out in a report just issued by the Metropolitan Life Insurance Company under the title "Functions of an Industrial Eye Clinic." This study further describes methods employed by leading industrial enterprises for supervising the visual conditions of workers through plant clinics.

"In almost any industrial plant where careful eye tests are conducted by an oculist, it will be found on the initial eye survey of employees that about 40 to 50 per cent have subnormal vision needing correction," the report states, and proceeds to describe the equipment and procedure necessary for correcting this condition. Several illustrated pages are devoted to a description of the technic of eye examinations, including a section on the many types of color blindness and recently devised methods of detecting it.

Particularly interesting to the industrialist is the chapter "Principles of Illumination" which tells about increase in productive efficiency traced directly to better vision. When the U. S. Public Health Service carried on a series of tests in the Post Office Department, it was found, the report states,

... that increasing the illumination from 2.7 to 10.7 foot-candles resulted in an increase of about 8 per cent in the number of pieces of small mail which could be sorted. . . . Investigations by Dr. M. Luckiesh indicate an increased speed of 15 per cent in reading ordinary printed matter for an increase of illumination from a value of 4 to a value of 16 foot-candles. For black print on gray paper the increase in speed was 50 per cent.

Discussing quantity, color, glare, and diffusion of light, the report sums up the subject by saying:

Among the advantages of good lighting in work places are greater accuracy of work, less eyestrain, increased production, less wastage, increased efficiency because of the greater ease with which work can be supervised, better order and cleanliness, and a reduction of accidents. A psychological effect may also be obtained through more cheerful surroundings due to good lighting, resulting in greater contentment and cheerfulness among workers.

The concluding chapter deals with Light Codes.—Policyholders Service Bureau, Metropolitan Life Insurance Co., N. Y. (1931).

**Tests Prevent Lead Poisoning**—During the 10 months ending with September, 1,040 blood tests for lead poisoning had been made in the Chicago branch of the diagnostic laboratories of the Illinois State Department of Public Health. Up through May, from 36 to 57 per cent of the tests made each month indicated marked absorption of lead on the part of the individual from whom the blood specimen was taken. This indicated that he was on the way to physical disability from lead poisoning.

Beginning with June the percentage showing a high degree of absorption has declined sharply. Of the 117 tests made in September, only 16 or 13.6 per cent showed a marked absorption.

Shifting employees to different jobs caused the change. Employees who were found to be absorbing lead at a significant rate were shifted to jobs where the exposure to lead poisoning was less or altogether absent.

This experimental work was made possible by the coöperation of a group of industrial physicians. Certain employees were chosen for the tests. Employment was shifted in cases that seemed to indicate the desirability of this procedure. The change in the tests suggests that this procedure was effective.—*Illinois Health Messenger*, 3, 21: 83 (Nov. 1), 1931. E. R. H.

# CHILD HYGIENE

## A STATE DIVISION OF INFANT AND CHILD HYGIENE

THE logical development of a Division of Child Hygiene in a State Board of Health is well exemplified in Indiana. Prior to 1919 sporadic attention was given to child hygiene, but in that year growing interest in the child culminated in the establishment of the Division of Child Hygiene. From the very first a comprehensive plan of organization was followed. The child hygiene work in that state has developed consistently year after year under the same general direction.

In July, 1922, federal assistance, under the Sheppard-Towner Act, was made available. For 7 years the Division of Child Hygiene carried out a consistent program that reached every county and township in the state. When the federal subsidy ceased, the momentum created by widespread health education and trained direction of child hygiene carried the activities through 3 trying years with but little slowing-up.

The administration of the Indiana Division of Infant and Child Hygiene has been under the able direction of Dr. Ada E. Schweitzer. The personnel of her Division consists of:

<i>Office:</i>	1 secretary
	2 stenographers
	1 artist-stenographer
	1 statistician
<i>Field Physicians:</i>	5 field physicians
<i>Field Nurses:</i>	6 field nurses
<i>Field Assistants:</i>	5 field assistants

### ACTIVITIES

The following health educational programs have been conducted:

1. County-wide child health conferences have been held for examination of infants and preschool children and for consultation with parents who bring their children to some central place in each community. Supervision by the family physician is advised and a parents' report card contains findings of the child hygiene division physicians. Routine advice concerning diphtheria, smallpox, and typhoid immunization is given. Special requests for examinations in one or more places in a county were granted if possible. One series of well baby clinics was conducted to demonstrate the value of periodic examinations.

2. A 5-period course in maternal, infant, and preschool care and in adolescent problems has been offered to adults, chiefly women, and to high school boys and girls. Lectures and demonstrations on growth and care of children were given to girls and women. The films reviewing the course were also shown to the young men.

3. Correlation of community health programs was encouraged. Assistance was given in planning programs.

4. Exhibits including poster groups, table displays, and pamphlets and books were available on request. A special exhibit was prepared for the American Public Health Association and one for the American Medical Association, and for the State Medical Association and State Health Officers Conference, the State Parent-Teachers, Federation of Women's Clubs, and many other national, regional, state, and local associations.

5. Motion pictures were planned for meetings of state and local organizations, for schools, churches, and clubs, and for other local programs.

6. Lectures and practical talks were given on growth and care of children.

7. A weekly health education talk was broadcast from station WFEM, one talk from station WKBF, and two from WLS.

8. Gorgas Memorial Association feature articles were prepared for publication.

9. Health projects were planned in personal conferences.

10. Programs were prepared to be carried out by state-wide groups.

11. Health pamphlets were distributed.
12. Special projects designed to instruct large groups, as the parent education program at Winona Lake, the State Fair better babies demonstration, and college classes, were conducted.
13. Staff schedules and state-wide Child Health Day programs were organized.

#### GENERAL WORKING PLAN

"Wherever possible county and township chairmen assisted in organization for any type of activity. They were selected from groups having county-wide organization. Local health officers, nurses, physicians, school officials, and lay groups usually assisted the state child hygiene workers."

Each field staff organizes and conducts conferences, classes, and other health projects. Special organization is planned for such activities as Child Health Day, state fairs, and parent education institutes.

The major activity for the year 1929-1930 was the child health conferences, in the preparation of which the field staffs visited 35 counties and 190 towns.

#### EDUCATIONAL PROGRAM

"The most outstanding part of the educational program, the class instruction to women and to high school girls and boys, includes lectures by a child hygiene physician, demonstrations by the child hygiene staff nurse, and exhibits of health posters and charts, and motion pictures.

"During the past year this instruction has been given largely to high school girls, with suitable health films for boys, who have shown a splendid attitude and much interest. Always the work is adapted to the type of group receiving it. The high school girls ask

questions, take notes, and are generally alert to all that is offered them."

The annual reports of the Division of Infant and Child Health are replete with valuable suggestions and analyses of extensive data.

#### PRENATAL CARE

The studies made of examination records by members of the staff reveal conditions which should interest every health official. For example, a history of prenatal care, based upon the records of 7,311 women who brought children for examination to county conferences, showed the following:

- 22.0 per cent had no prenatal care
- 3.4 per cent had 6 weeks or less
- 24.0 per cent had 6 weeks to 6 months
- 50.5 per cent had 6 to 9 months

"A study of the percentage of women who had abnormal labor would indicate that many women consulted their physicians because of abnormal conditions and that many others did not consult physicians because no alarming symptoms appeared. At any rate, the highest percentage, 91.7 per cent, reporting normal labor appears in the group having no prenatal care."

#### IMMUNIZATION

"The proportion of children immunized to one or more diseases is improving. Last year histories of children examined showed 1 in 5; this year the ratio is 1 to 4.5. These are chiefly pre-school children who are brought to county child health conferences for examination. Indiana parents generally do not as yet understand the importance of diphtheria immunization under 1 year."

# PUBLIC HEALTH NURSING\*

**The Hospital Nursing School and Economics**—Cost studies of nursing schools are coming in to the Grading Committee. Of 111 hospitals which figured what it would cost them to give up their schools, 19 would save money, 92 would lose money. In this study, for every 10 students let go, 18 per cent of the hospitals would need (plus maids and orderlies) 0-3 registered nurses; 19 per cent would need 4; 28 per cent would need 5; and 35 per cent would need 6 or more registered nurses. If giving up their schools, 40 per cent would reduce the teaching and supervisory staff; 50 per cent retain the same number; and 10 per cent would add to their number.—Take Out the Profit, *Am. J. Nurs.*, XXXII, 1: 54-55 (Jan.), 1932.

In this connection it is interesting to note that a letter from J. C. Geiger, M.D., Health Officer for the City and County of San Francisco, Calif., to the American Public Health Association, states that on January 1, 1932, the San Francisco Hospital closed its nursing school and thereafter would employ only graduate nurses to care for its patients. Dr. Geiger writes:

The Committee on the Grading of Nursing Schools has found that the number of schools and the number of graduate nurses is out of all proportion to the public demand. The Department of Health, in closing its undergraduate school of nursing, has been mindful of the overproduction of nurses, with their resultant unemployment and has welcomed the opportunity to assist in adjusting this economic situation.

In opening the hospital to a postgraduate school of nursing the administrators feel that a definite contribution will be afforded the

community by the opportunity offered for advanced training in the special fields which are available at the San Francisco Hospital. Advanced courses in children's diseases, maternity, operating room technic, tuberculosis, and communicable diseases, are now outlined with the development of special courses in ward administration, genito-urinary diseases and psychiatric nursing proposed for the near future.

**Do You Know What an Hourly Nursing Service Is?**—Nurses themselves have been responsible for the hourly nursing service movement because it seems to offer one solution of the problem of how to reduce the cost of illness. Yet despite the fact that this service is badly needed in most communities, and is available in many urban communities and in some towns, and even in rural centers, it is growing rather slowly in popularity. Either patients do not know about it or no one remembers to suggest it.

An article by Miriam Ames in the December, 1931, *Hygeia*, entitled "Fifty Ways to Use the Hourly Nurse," explains this service so clearly and completely that the American Nurses Association, 450 Seventh Avenue, New York, has had reprints made which can be obtained from their office at a cost of 5 cents each. There ought to be a big run on these pamphlets.—Miriam Ames, *Fifty Ways to Use the Hourly Nurse*, *Hygeia*, IX, 12: (Dec.), 1931.

**Public Health Nursing in New South Wales**—New South Wales is the oldest Australian state. Its area is somewhat greater than that of Texas and its population about half as large.

In 1912 there was only 1 trained nurse employed in public health work in New South Wales; there are now 215, including those employed by the gov-

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 West Hulse Annex, Indianapolis, Ind.

ernment and by private or unofficial agencies.

*Nurses Employed by Official Agencies*—The Department of Infant and Maternal Welfare employs 111 nurses with a supervisor.

The Tuberculosis Division of the government employs 2 trained nurses who have also the certificate of the Royal Sanitary Institute.

The Department of Education (Medical Branch), under the direction of the Medical Director of Education, employs 13 nurses.

*Nurses Employed by Unofficial Agencies*—There are 41 Bush Nurses scattered in different parts of New South Wales—the organization which finances them receives a small government subsidy.

The District Nursing Association, which is supported by private subscription and subsidized by the government, employs 12 nurses who visit the sick poor in their homes.

The Royal Prince Alfred Hospital has 2 nurses who visit tuberculosis patients. The Fenwick Hospital employs 6 visiting nurses, and the children's hospital 1.

The Lactogen Company employs 1 nurse.

There are 5 nurses employed by the Plunket Association, who give advice to mothers according to the teaching of Sir Truby King, under the direction of a supervisor.

There are 17 industrial nurses employed by private firms.

Dr. J. S. Purdy, M.D., Medical Officer of Health for the Metropolitan Combined Sanitary Districts, with headquarters in Sydney, is studying and seems to be very much interested in generalized public health nursing services in other parts of the world. He has a keen

grasp of what this type of a service could mean for he writes:

General public health nursing in contradistinction to "specialized" nursing, means simply that nurses are assigned to general nursing work of all kinds in small districts instead of being assigned as individuals or groups to special nursing activity on a city wide basis. Generalized nursing in its broadest sense includes not only instructive nursing but bedside nursing as well. It is difficult to separate instructive nursing from bedside nursing because in many cases the success of the health nurses' effort to instruct and advise is contingent upon her helpfulness in actual care of the sick patient. When a member of the family is sick, the nurse who is prepared to do something tangible for the comfort of the patient is better able to get a hearing on other health matters. It often happens that her success in preventing disease depends on her care and management of the individual during illness.

The natural tendency in the organization of health nursing activities is toward specialization of nursing assignments in various fields of communicable disease work, school health work, prenatal work, infant welfare work, etc. Although the nurse specialist acquires a technical skill in dealing with these special activities which she could not acquire if her duties were of a more general character, specialization in public health nursing tends to considerable overlapping and duplication of work and prevents the nurse from acquiring a well rounded view of the many sided problem of community health. Then, too, the nurse should be a public health nurse instead of a communicable disease nurse or a tuberculosis nurse, child welfare nurse, or what not, for as a knowledge of public health needs has grown, it has become apparent that to deal effectively with the individual "case" of sickness the health visitor must be capable of dealing with a great variety of related problems in the home.

—*"Nurses Employed in Public Health Work in the State of New South Wales"* and *"Generalized Public Health Nursing,"* by J. S. Purdy, M.D., Medical Officer of Health for the Metropolitan Combined Sanitary Districts of the State of New South Wales.

## EDUCATION AND PUBLICITY\*

Is There a Plan?—The wide range of press release topics issued by different states during the same period is quite puzzling. To a degree they reflect department programs, but that does not fully account for the diversity.

Are there plans for a progressive development of subject matter, with due allowance for seasonal topics and emergency matters?

Are press releases accompanied in some states by corresponding plans for other forms of presenting the same topics?

Are meeting topics offered to local groups? Suggestion of the press topics for use by speakers?

Are there plans far enough ahead so that local meeting programs could be planned for the weeks when certain topics are to be presented in the newspapers?

Are such plans desirable? Are they practicable?

Are such questions as the above worthy of detailed consideration by state and local health workers?

Says *Mind and Body* in a recent issue:

Teaching without a program is like sailing a boat without a compass—one just goes without knowing where.

*They Are So Varied*—Omitting releases on departmental activities or announcing or reporting meetings, here are the topics of material supplied recently to the newspapers by state and national departments of health:

*Connecticut*: "Survey of Indoor Pools"; "Can Smallpox be Controlled by New Year?"; "Conserving Eye-

sight"; "Smallpox Again"; "Smallpox Vaccination Necessary"; "Christmas and New Year Greetings"; "Health Officials Concerned in Protection of the Public Health."

*Iowa*: "Christmas Greetings" (to editors, nurses, teachers, and organizations); "Christmas Presents" (diphtheria prevention); "Trichiniasis"; "Opportunities—And Resolutions"; "From Pail to Palate"; "Tularemia"; "Dangers Associated with Decreased Appropriations."

*Maryland*: "Read the Labels" (on holiday food flavorings); "Christmas Presents" (diphtheria immunization); "Regulations in Regard to Anti-Freeze Mixtures"; "What They Do" (bacteriological laboratories); "Last Year's Record"; "Facts and Fallacies" (mouth hygiene); "The Maryland Family"; "What and When and Why" (paragraphs of public health news); "Tune In on Station KYH" (Keep Your Health).

*New York*: "Leisure and Health"; "Pneumonia a Preventable Disease"; "Trends in Mental Disease"; "Football and Health"; "Athlete's Foot"; "Climate and Tuberculosis" (all radio).

*Oregon*: "Pneumonic Danger"; "The Double-Barred Cross of the Christmas Seal"; "What is a Public Health Nurse?"; "Contagious Sores." Every weekly press release is accompanied by tabular "Report on Communicable Diseases" (no comment). "Moist Air Necessary for Health"; "Immunize Early Against Spotted Fever"; "Every County and City Needs a Health Department"; "Hand Washing and Communicable Diseases."

*Virginia*: "Cleanliness in Surgery" (radio).

\* Please address questions, samples of printed matter, criticisms of anything which appears herein, etc., to Isaac G. Koutzko, 139 E. 22d St., New York, N. Y.

*U. S. Public Health Service:* "Health Conditions in the United States" (1930-1931); "Prevention of Cancer"; "Present-Day Problems of Yellow Fever"; "Health Conditions Throughout the World"; "Items of Historical Interest Relative to Pellagra in the U. S."; and the following broadcasts: "The Care of the Teeth"; "Public Health Nursing"; "Starting the New Year Right"; "The Health Problem of the American Negro"; "Remarkable Remedies from the Endocrine Glands."

**Is Any Department Too Small?**—Too small and lacking in funds to get out its own house organ or health bulletin? The spread of mimeographed bulletins suggests that a department or other health agency need not be without a bulletin *if it has something to tell the public in that form.*

In small cities and towns, especially, so much can be asked of volunteers. We know of bulletins of welfare agencies which are mimeographed in some business office without cost. Volunteers may be secured for the folding and mailing. The actual cash outlay could be limited to postage, envelopes and mimeograph paper. Ready-stamped envelopes will reduce cost and labor.

Possibly the important question to be settled is: "Have we anything to say which could be said better through our own bulletin than through the newspapers?"

**Uniformity with Variety in Reports**—What Illinois has been trying:

Before the preparation of the annual report for 1930-1931 of the divisions of the Department of Public Welfare was started, the department called together a committee of managing officers for the purpose of outlining a plan which would produce a better standard of report. . . . The committee were unanimous that a hard and fast outline which

every institution would be required to follow should be avoided. It was the opinion of all that each institution should have latitude to express itself. At the same time, it was felt that there was certain information common to all institutions of the class, which should appear in the annual reports. Accordingly the committee set up those subjects on which each institution should be expected to make a report. Among these were: movement of population and personnel; medical department; research and education; occupational therapy; recreational therapy; diet; dentistry; nurses; attendants; paroles; farm, garden and dairy; schools; repairs and improvements; cemetery; and recommendations.

**How to Select Posters for Classroom Use?**—A revised edition of *Some Posters on Child Health* (American Child Health Association, 450 7th Ave., New York. *Free*) says:

When selecting published posters for the schoolroom, consider these points:

Will they be of assistance to the teacher and to the child in initiating activities?

Are they of sufficient interest to the child to affect his behavior?

Will they increase his understanding of healthful living?

The most effective use of a poster is as an illustration of some definite health lesson, or as a stimulus to the practice of a health habit that has already been discussed. Simply to hang a poster on the wall and expect it of itself to bring about an improvement in health practices, is to ask too much of the poster or the child.

Probably more effective than any printed posters are the ones worked out by the children themselves as an expression of the health ideas they have formed.

**Undated Publications**—For libraries, for students, for writers, and for other readers it is often important to know the date of a publication. And frequently the date is of first importance and so should be easy to find. Here is an important statement on "The Care of Mental Defectives in New York State." *At what date?* Half way through we find "(in 1929)"

—which may or may not indicate data suitable for a given purpose.

*Please date your printed matter*—at front or back—for the sake of your readers, or some of them.

**Average Attendance of 2,000—**That is the record of the first series of public lectures given by the Health Education Foundation of the Cleveland Academy of Medicine. A nucleus of \$10,000 was provided by the Academy.

When recommending the Foundation the Committee on Health Education cited the following possibilities:

1. To apply scientific research to present health education methods and material to test their worth and effectiveness.
2. To provide public health lectures, carry on publicity in the interest of health through paid space in publications, through radio broadcasting, through group or individual instruction, and through other means as conditions may warrant.
3. To acquaint the public with all the advantages the community offers in the way of caring for the sick and the prevention of disease.
4. To seek to increase observance of the laws, ordinances and statutes affecting public health.
5. To urge the adoption and enforcement of legislation in the interests of health.
6. To advise the public against exploitation.

The *Bulletin* of the Academy (April, 1931) says:

Criticism has been aimed at much of the health education propaganda in the past. Much of the criticism has been based on ignorance, but some has been justified. Probably, the two greatest failures have been lack of intelligent direction and lack of funds. As the *Plain Dealer* phrased it, Health education has been the "Orphan Annie" of many institutions. Being merely an adjunct of larger programs (usually service programs), it has received short shrift as far as the dollars available are concerned.

The Foundation is, so far as we know, the first attempt to put health education on an endowment basis. There are, of course, endowments for specific fields of activity, but none solely for the study and propagation of education in the active field of public health. Therefore, its importance is more than local.

**The Ability to Plan—Says Dr. J. Mace Address:**

The ability to plan is one of the first qualifications of a health educator. What are your most pressing needs in health education? What plans will you formulate for the New Year?

Dr. Address urges extensive health education planning, by school systems, by single schools, by individual classrooms.

How a plan may be directed at a simple objective is illustrated:

Let us suppose that the prevention of colds is to be the goal of a health program in a certain school. This is an illness that leads all others in most schools. The principal or health teacher who is to initiate this program should first get the coöperation of the teachers, school doctors, school nurses, and parents. A program if it is successful should be understood and approved by all those who come in contact with the children. It might be well to have the whole matter brought up before a parent-teacher meeting. Coöperation of the parents is especially necessary in this project, since most colds are communicable; children should be encouraged to stay at home at the onset of a cold. More sleep, rest and attention to hygienic living are desirable. These are not to be gained ordinarily unless parents and children work together. Through health teaching the school may hope to guide and motivate children in the right way.

Although the prevention of colds may seem at first to be the only objective it is easy to see that the carrying out of such a program would involve almost every aspect of healthful living. Although there is still much to be learned about colds it is obvious that we know enough so that with united efforts they cannot only be reduced but those contracted may be less serious.—

Should We Adopt a Five Year Program for Health Education? *Hygeia*, Chicago. Jan., 1932. *Sample free.*

**Single Samples Only—**Sample copies are usually available, but readers will be disappointed if they ask for quantities of material issued by state and local agencies.

If you want more copies it is safe to ask the price.



**Many Questions Answered**—To help answer letters of inquiry from teachers, public health workers and others a group of tentative memoranda has been prepared and is being submitted for criticism and suggestion. Copies of the tentative memoranda will be sent to those who will promise to write out their criticisms and suggestions. When issued the revised editions will be offered to all who care for them. Here are some of the titles:

Sources of information on health education problems and methods in elementary schools; health education: free material for distribution to pupils; posters: hand-made or school-made; posters: in school health education; plays: health; marionettes: puppets.

**Thin Ice**—Leaders in the nursing profession have been aroused by the use of the uniformed nurse in advertisements, and direct testimonials for merchandise signed by nurses. "New Ethics in Publicity," by Meta Pennock, A.B. (*Trained Nurse*, 468 4th Ave., New York. Dec., 1931. 35 cents) is illustrated by numerous advertisements in which the nurse is featured.

Strange as it may seem in 1932 there was a time when the medical profession—

and the nurse interpreter kept their wisdom to themselves with the idea that science was much too complicated to be interpreted to the lay mind—and at times the accompanying idea that if this knowledge were common property they would have less standing professionally and less profit financially. . . .

Swept in by the public health group came the new attitude—that the teachings of science should be reduced to their simplest terms so that all might apply them with the degree of understanding which each possessed. From this standpoint all the sound information on health habits and healthy living which can be conveyed through advertising in magazines, on the radio, or in the writings on the sky is that much benefit to the public. Carried on this tide of helpfulness and freed from the narrow-shouldered type of ethics of the previous generation, the physician has stepped out of his office into the public forum. The nurse,

who is his interpreter and his extender, has followed suit, and is showing by precept and practice how science may be applied for the prolongation of life and for its enrichment. . . .

Miss Pennock discusses the dangerous situation when a nurse gives a health talk on time purchased by an advertiser.

First she should ascertain from reliable sources the standing of the organization under whose auspices she is asked to speak.

A list of the sources of information follows with a reminder to consult—

local scientists in good standing—doctors, health workers, public health nurses and others as to the content of the address to be delivered.

The nurse's responsibility to the public and to her profession forbids her to include—

any endorsement or testimonial of the product or products of the manufacturer or dispenser who sponsors the broadcast. She must also exact the promise that she be permitted to read in advance and approve of every word of the announcer or continuity speaker who carries the program with her. This prevents her talk from being coupled with unwarranted or exaggerated claims for the product and avoids the possibility of giving the impression that she endorses the organization or its products.

The advice about giving testimonials is quite positive.

This question of written, spoken or implied endorsements or testimonials can be handled in but one way: Like that famous advice to those about to marry, the answer may be summed up in the one word, "Don't." European professors of medicine who are sorely in need of money to continue their researches may step out of their scientific frames to recommend yeast, antiseptics, or soap, but in America it "just isn't done." Good ethics throws down the challenge of placing the public in a vulnerable position.

Praise of the nurse-speaker is to be guarded against by careful examination of all introductory speeches.

With the permission of those organizations with which she is associated—the local hos-

pital, the local visiting nurse's association, etc., these connections may be mentioned because they tend to give the public confidence in the health information which she will impart. The university from which she obtained her general education and the nursing school from which she was graduated, as well as membership in professional or educational bodies, are also clues which the public seeks in its effort to measure the degree of authority or scope of knowledge of the person whose health advice is to be followed. She speaks, therefore, not as an individual but as a representative of every group mentioned and her responsibility as such a representative is thereby increased a hundred fold.

The article continues with a group of dilemmas faced by physicians, nurses and research workers, and how they met them. "Was this ethical, was this protecting the public?" is asked of each case.

These examples touch upon the writing of booklets and other material, both signed and unsigned. Miss Pennock draws her own conclusions, and points to the recently published code of the New York Academy of Medicine and the Medical Society of the County of New York as a further guide.

#### NEW

*Better Times*, long published as a miniature magazine record of health and social welfare in New York City, is now issued by the Welfare Council, 122 East 22d St. The page size is now larger; weekly news issues, with four magazine issues a year. *Sample free.*

*By The Way*, Health Education Division, Children's Fund of Michigan, 660 Frederick St., Detroit. Mimeographed bulletin.

*New Mexico Health Officer*, State Bureau of Public Health. 9 pp. Mimeographed.

#### HONORABLE MENTION

To Merrill-Palmer School, Detroit: For biennial report with both contents and index.

#### RADIO

Boston has been broadcasting over WEEI a series of conversations on White House Conference subjects. Frank Kiernan, Dr. Raymond S. Patterson and Dr. Lila Owen Burbank have exchanged questions, argued, agreed or disagreed via radio.

"Hydrophobia" and "Explorations in Nutrition" were recent topics broadcast by Dr. Haggard Sunday nights. *No charge* to receive printed copies weekly. Address Eastman Kodak Co., Rochester.

Present and Impending Applications to Education of Radio and Allied Arts is a revised edition of one issue of the Information Series of National Advisory Council on Radio in Education, 60 East 42d St., New York. Presents, intelligibly to the layman, the mechanical and other scientific conditions and problems in broadcasting, television and sound pictures; definitions of terms. *Free.*

Five-minute broadcasts on mental hygiene, 20 of them, with 8 on child guidance, are reprinted in Radio Talks on Mental Hygiene and Child Guidance. New York State Dept. of Mental Hygiene, Albany. 54 pp. *Free.*

The "world's biggest gymnasium class" is now directed over stations WEAf, WEEI, WGY, WBEN, WRC, WCAE, WFI, and CKGW. Daily, except Sundays and holidays, at 6:45, 7:00, 7:20 and 7:45 A.M. Self-Directed Body-Building Drills is 8-page illustrated folder supplied free by Tower Health Broadcasting Station, Metropolitan Life Insurance Co., New York.

Quite a series of mimeographed copies of broadcasts will be supplied by Bureau of Health Education, Dept. of Health, 139 Centre St., New York. *Ask for a list.*

Various radio talks are reproduced in *Monthly Bulletin*, Philadelphia Dept. of Public Health, *Connecticut's Health*

*Bulletin* (State Dept.), and *Pittsburgh's Health* (Dept. of Public Health).

Baltimore Health Dept., in collaboration with the Medical School of University of Maryland, has inaugurated weekly broadcasts over WBAL, Tuesdays at 6:15 P.M.

New York State Dept. broadcasts over WGY are now given on Wednesdays at 6:15 P.M.

#### DEPRESSION

What are the results of unemployment and depression conditions upon health, both now and in the future?

Please send your impressions, your observations, your fears.

Have you any statistical data, or are you planning to gather any?

"Do Hard Times Harm Health?" Notwithstanding the statistics as given out by Surgeon General Cumming, dare we ignore such statements of fact as the one given out by the United Hospital Fund of New York? *American Medicine*, New York. Nov., 1931.

"Unwise Economy to Curtail Health Services." Statement in *Health News*, New York State Dept. of Health, Albany.

This is a time when nutrition is again a news topic. Under the leadership of the Food Administration during the war, balanced diet and suitable food for various age groups was spread far and wide, using food saving as a peg on which to hang information. In the present emergency again, economical balanced diet is of major interest.

"Emergency Nutrition Special" of *American Child Health News* (clip sheet), 450 7th Ave., New York (Jan., 1932), gives material for house organs and other uses. *Free*.

"What best to do with an inadequate amount of money?" is answered simply and practically by H. C. Sherman, Columbia University, in *Child Health Bulletin*, American Child Health Assn., 450 7th Ave., New York. Nov., 1931. *Free*.

The Connecticut State Dept. of Health has reprinted the above as a 4-page folder.

Somewhat the same information is expressed even more simply and more graphically, in form for popular distribution in *Getting the Most for Your Food Dollar*. Bureau of Home Economics, U. S. Dept. of Agriculture, Washington. *Free*. Reprinted in *Red Cross Courier*, Washington. Feb., 1932.

"Food and Nutrition in the Depression Period." Editorial in *J. A. M. A.*, 535 N. Dearborn St., Chicago.

#### SPECIAL EVENTS

Ask for celebration material, addressing U. S. George Washington Bicentennial Commission, Washington Bldg., Washington, D. C.—if you wish to give a health angle to the celebration.

May Day—Child Health Day is not far away. For suggestions address American Child Health Assn., 450 7th Ave., New York.

National Negro Health Week comes April 3–10, 1932. Supplies need to be ordered quickly. Last year half the orders were sent in too late to print large enough editions. Posters and Negro Health Week Bulletin each sell at \$1.25 for 100, \$12.50 for 1,000. Order of Superintendent of Documents, Washington, D. C.

#### CONTESTS

*Journal of the Outdoor Life*, 450 7th Ave., New York, offers prizes for mystery stories. "Must be strictly mystery stories, not necessarily murder stories. . . . Tuberculosis must in some way be connected, though the setting may be anywhere." Closes April 1, 1932. *Write for details*.

Awards for essays and plays or pageants offered to schools of nursing and members of district associations by American Nurses' Assn., 450 7th Ave., New York. Closes May 1, 1932. *Write*.

Posters on fresh air are to be judged for prizes by Anti-Tuberculosis Society, 207 N. Centre St., Pottsville, Pa. The classification and rules will be *supplied on request*.

Hundreds of talks were prepared by high school students last year for the radio public speaking contest conducted by the Minnesota Public Health Assn., St. Paul. Nearly a hundred talks were selected in preliminary contests before high school assemblies. Ten talks, in the final contest, were broadcast by the students on consecutive days. A similar contest is now under way.

#### EDUCATIONAL

Educational effort among special groups often may prove more significant and far-reaching in its influence than some more appealing and even spectacular efforts to reach the general public. Other health workers, social workers, key men and women in the varied clubs, professions and other groups, make up some of these special audiences.

From month to month time may be taken to advantage for mailing a few copies of highly specialized publications to very carefully selected names.

Much of the material listed below is useful for such specialized educational effort.

Adequate County Health Organization, Tuberculosis Control and the Medical Profession (13 pp.); Medicine: The Tortoise—Why Pick on It? (equals 7 pp.). By D. D. Armstrong, M.D. Metropolitan Life Insurance Co., New York. *Free*. Reprints.

The Frontier Nursing Service, by Anne Winslow. Committee on the Costs of Medical Service, 910 17th St., N.W., Washington. *Free*.

Income From Medical Practice, by

R. G. Leland, M.D. American Medical Assn., 535 N. Dearborn St., Chicago. Reprint. 24 pp. *Free*.

The Newer Aspects of Anti-Tuberculosis Work, by Iago Galdston, M.D. Address the author: New York Academy of Medicine, 2 East 103d St., New York. 11 pp. Reprint. *Free*.

Principles and Problems of After-Sanatorium Care, by Edw. Hochhauser. Address the author: Committee for the Care of the Jewish Tuberculous, 71 West 47th St., New York. 10 pp. *Free*.

The Coming Baby (22 pp.); The Care of Baby (34 pp.); Food—The Teeth and Health (30 pp.). Substantial pamphlets; simple illustrations—the third one with color. To be issued: The Pre-School Child. Dept. of Health, 139 Centre St., New York.

Smallpox and Vaccination: Information for Physicians. Connecticut State Dept. of Health. 8 pp. *Free*.

Your Emotions; Behavior Patterns; and 12 other 4-page folders. New York State Dept. of Mental Hygiene, Albany. *Free*.

Books for Parents, Teachers, Social and Public Health Workers; For Your Home Library; A Selected List of Social Hygiene Publications; Free Folders and Leaflets. American Social Hygiene Association, 450 7th Ave., New York. *Free*. Lists of publications.

The Prudential Insurance Co., Newark, N. J., offers booklets and folders on exercise, smallpox, diseases of children, food, tuberculosis, child health, first aid, common drinking cup, cancer, hiking, and "Our Babies." The last is the large illustrated pamphlet by Dr. H. N. Bundesen.

Safety and Simplicity in Infant Feeding; A Safer World for Babies. Evaporated Milk Assn., 203 N. Wabash Ave., Chicago. *Free*.

## BOOKS AND REPORTS

*Proceedings of the National Conference on College Hygiene—Sponsored by the President's Committee of Fifty on College Hygiene, The National Health Council, The American Student Health Association. New York: National Tuberculosis Association, 1931.*

This report, just issued, is one of the most arresting which has come to our attention in a long time. In view of the fact that there are upward of 1,000,000 students in our universities, and that these are in a formative period of life, the importance of the subject may be appreciated.

The report does not lend itself readily to review, consisting as it does of reports by sub-committees which have been carefully edited and are succinct.

We may mention as outstanding features the conclusion that every college, regardless of size or resources, is under obligation to make arrangements for the protection, maintenance and promotion of the health of its students and the treatment of those physically or mentally sick or socially maladjusted. The educational purposes of a college are not adequately served when there is lack of arrangements for instruction concerning maintenance and protection of physical, mental, and social health. Tentative rules are given for the carrying out of these fundamental propositions. All college health teaching and physical welfare activities, including health service, physical education, and intercollegiate activities, should be conducted under one administrative unit, or equivalent. Among other procedures, the routine Wassermann test is advised. The common cold is a most important factor in morbidity, and should not be lightly

considered as at present. Early and intensive treatment is required.

A special report was made on tuberculosis. A complete history of all new students, physical examination and routine tuberculin tests (Mantoux intradermal), with X-ray pictures of all giving positive reactions, which should be repeated if suspicious signs should appear, are advised.

It is held that it is a fundamental responsibility of a college to limit its use of the interest from its trust funds and other financial resources to the education of students whose intellect, health, and personality give reasonable assurance that the educational investment will not fail because of early incapacity or premature death.

We know of no publication which gives in so little space such a clear exposition of the underlying fundamentals of college health, the responsibility of college authorities, combined with putting an outline for the recommendations into effect. MAZÏCK P. RAVENEL

*Examination of Water—By William P. Mason and Arthur M. Buswell (6th ed.). New York: Wiley, 1931. 224 pp. Price, \$3.00.*

This sixth edition of Professor Mason's well known textbook, *Examination of Water*, revised and enlarged by Professor A. M. Buswell, bears a worthy testimony to the esteem in which previous editions of this book have been held. Chapters are presented dealing with: (1) chemical examination of water, (2) routine laboratory methods for the estimation of mineral constituents, (3) laboratory exercises in water treatment, and (4) the bacteriological examination of water.

In revising the text, new methods, such as the determination of hydrogen ion concentration and the use of eosin methylene blue agar, have been incorporated; the wording and terminology in certain instances have been modernized; and the appendix has been extensively enlarged by adding, (1) standards for use in water analysis, (2) forms and tables of value in water purification work, and (3) drinking water standards of the Treasury Department for drinking and culinary water supplied by common carriers in interstate commerce.

To a great extent the spirit and characteristic wording of the original text have been retained. The book is not intended for the research worker or graduate student but rather for the undergraduate who is being introduced to the subject for the first time. Apparently for this reason considerable space is devoted to the citation of experiences and definite illustrations which provide an educational background for the student. This tends to create a more intense interest in the analytical procedures described.

As frequently happens in first printings, an occasional error appears: for instance, the term "chlorine" when chloride is intended has been correctly changed to chloride in the text—a corresponding change was not made in graphs; on page 150 the specification for the sterilization of glassware is given as 170° C. for 1½ hours, while an illustration on the facing page suggests 170° C. for 1 hour; and the page heading of eosin methylene blue agar is carried from pages 151 to 161 although it applies only to one page.

C. T. BUTTERFIELD

*A Short History of Nursing—By Lavinia N. Dock and Isabel Maitland Stewart (3d ed.). New York: Putnam, 1931. 404 pp. Price, \$3.00.*

Probably there are few graduate nurses today who did not study either

Nutting and Dock's large *History of Nursing*, or Dock and Stewart's *Short History of Nursing* while in nursing school. Both are classics in the nursing world. The *Short History of Nursing* has been completely revised. In it the newer trends in the nursing school curriculum and the changing points of view in the teaching of history are considered. The volume is written primarily for the use of students in the nursing schools of the United States and Canada and is designed as an introduction to the social and professional aspects of nursing. It is hoped that it will have an ever-increasing use among students of general history in high schools and colleges, as there is probably no more dramatic or moving story anywhere of the life saving adventures of the race than can be found in the long line of nursing pioneers who shared in many of the episodes of world history and who led in some of its most constructive movements.

The backgrounds and foregrounds of nursing have been painted with a broad sweep, and only enough dates and names have been left in to trace the sequence of events. The main emphasis has been placed on influences, issues and trends in nursing, and, after all, this is what most of us wish to get when we read history. It is very satisfying also to have all sentiment laid aside and these influences, issues, and trends, interpreted clearly, sanely, and without bias.

The first part of the book is essentially the same as in the older editions, but the last chapters, in which the authors show how modern nursing came to other countries, and describe the movement for self-organization, the widening field of nursing service and, finally, the future nurse, her heritage and trust, is all either new or old material which is interpreted in such a new and refreshing way that we nurses who have been living and working contemporaneously with these changes and trends

find a great deal of new information and feel a new thrill of accomplishment in reading them.

At the end of each chapter is a list of suggested reading so that one may delve more deeply into the history of nursing if she wishes—indeed she is encouraged to do so. In the appendices there is a fine list of reference books for teachers and students, and other valuable material pertinent to nursing is included. There is a good glossary and index. The ingenious maps and original drawings by Jessie H. Stewart delightfully and effectively assist in interpreting and reinforcing the text. This is by far the best short history of nursing on the market and can be recommended without qualification.

EVA F. MACDOUGALL

**Nutrition and Food Chemistry**—By *Barnard S. Bronson*. Wiley, 1930. 467 pp. Price, \$3.75.

The modern teacher of nutrition finds some difficulty in the selection of a text or texts for his students. He needs a descriptive text which will deal adequately with the chemistry of the foods and the chemistry of their digestion and assimilation. He needs an adequate treatment of the vitamins and their rôle in nutrition. He needs further a text which will discuss the nature of current food offerings, how they are made and how their manufacture affects their nutritive value.

His students on the other hand find the problem of maintaining a library of texts to cover this range of subjects somewhat of a financial burden.

Both teacher and student will find in Bronson's *Nutrition and Food Chemistry* a happy solution of their mutual problem in one volume. Dr. Bronson has happily combined the above features in his new text. He has made excellent selection of essentials in all the fields and expressed them in a language that is simple and clear. He has

not condensed or abbreviated where detail of exposition is necessary, but he shows a full appreciation of what is essential. I find his text one that it is a pleasure to recommend to any student of nutrition regardless of whether his interest is in the scientific or the applied phases of the subject.

WALTER H. EDDY

**Ohio Conference on Sewage Treatment, Fourth Annual Report, Dayton, Ohio, October 16-17, 1930.**

The fourth annual conference on sewage treatment was held at Dayton, O., October 16-17, 1930, and drew an attendance of 104.

Papers presented were on the Dayton sewage treatment plant, by M. W. Tatlock, a detailed description of the pumping equipment, mechanical treatment devices, operation and gas collection and utilization; experiences with industrial wastes at the Fostoria sewage treatment plant, by A. B. Cameron, a very long and complete paper describing the sewage treatment plant, the operation, the wastes present in the sewage, including amorphous carbon, oil and grease, ferrous sulphate and sulphuric acid, remedial measures employed, rehabilitation and improvement of the plant; discussion of problems in other Ohio cities caused by presence of industrial wastes in their sewage; Some Observed Effects of Dilution in the Self-Purification of Streams, by J. K. Hoskins, covering results of observations made by the Stream Pollution Investigations Station, U. S. Public Health Service, Cincinnati, on the Ohio River and tributaries, the Illinois River, and others; Relation between Design and Operation of Sewage Treatment Works, by Robert A. Allton; and Some Observations on the Design and Operation of Sewage Treatment Plants for Country Clubs and Private Estates, by R. F. MacDonald.

VINCENT B. LAMOUREUX

**Simple Lessons in Human Anatomy**  
—By B. C. H. Harvey, M.D. Chicago: American Medical Association, 1931. 434 pp. Price, \$2.00.

This is the publication in book form of a series of articles which appeared originally in *Hygeia*, the magazine published by the American Medical Association. There has been some revision, largely by the introduction of additional material and illustrations.

The book is divided into 20 chapters covering, in simple words, the anatomy, construction, and relationship of the various parts of the organs of the body. The material is written in a clear and interesting way, and is made even more interesting by the insertion, wherever it seems necessary, of some material on embryology, showing how the various structures originated and also some material on the hygiene of certain parts. There is a very interesting chapter discussing briefly the structure and function of the endocrine glands. The final chapter is on cell division.

Numerous clear and instructive illustrations greatly increase the value of the book.

The book was designed and written for the use of the layman. For him it is very valuable and interesting material. It enables him to get a fairly definite concept of the growth and structure of the human body in a relatively short time.

CHARLES H. KEENE

**Living the Liver Diet**—By Elmer A. Miner, M.D., with Introduction by William P. Murphy, M.D. St. Louis: Mosby, 1931. 106 pp. Price, \$1.50.

This book is prepared for the guidance of pernicious anemia patients. In the foreword the author states that he has written it from the viewpoint of both physician and patient. It is a handbook on the liver diet, and presents in detail its preparation and service. The 12 chapters are: the liver diet out-

lined, liver, fruits, meats, vegetables, fats, sweets, starches, milk, seasoning, drinks, and the diet maintained. The directions will serve for those with little knowledge of food to follow implicitly the Minot-Murphy diet.

Numerous directions are given for the preparation of liver so as to increase its palatability, and for the preparation and serving of the different foods discussed in the several chapters. The book will be extremely useful to those who must follow the dietary regimen imposed by the pernicious anemia patient.

E. V. MCCOLLUM

**Allergy—A Handbook for the Physician and Patient, on Asthma, Hay Fever, Urticaria, Eczema, Migraine, and Kindred Manifestations of Allergy**—By Warren T. Vaughan, M.D. St. Louis: Mosby, 1931. 359 pp. Price, \$4.50.

Dr. Vaughan has given us a comprehensive handbook on allergy in its protean aspects, based upon his own experience and a careful sifting of the literature on this intriguing subject.

The book first describes what allergy means and how it affects the individual. The chapter on Allergic Equilibrium is especially enlightening and gives one a clear picture of the interaction of specific and nonspecific factors in the production of allergic symptoms.

Part II presents a complete list of allergens and antigens with the botanical and common names of pollinating plants. The chapter on geographical locations of the most important plants causing hay fever is well illustrated and proves very helpful in locating offending pollens.

A discussion of practical methods of diagnosis follows. A detailed questionnaire for inhalant allergies aids in differentiating an allergic from a non-allergic illness. The part dealing with therapy will be read with profit by physician and patient alike. Food avoid-



ances, food groups, elimination diets, physiologic readjustments, vaccine therapy, etc., are all discussed thoroughly.

Part V deals with prognosis and Part VI gives the manifestations of allergy and describes in detail the symptoms which may be associated with it.

The book concludes with a consideration of applied immunology, and an extensive bibliography.

This book can be heartily recommended as a practical, concise, and authoritative statement on allergy and its manifestations. RICHARD A. BOLT

**Eye, Ear, Nose and Throat Manual for Nurses.** (2d ed.) By Roy H. Parkinson, M.D. St. Louis: Mosby. 223 pp. Price \$2.25.

Dr. Parkinson's manual has the virtues of simplicity, clarity, and brevity. The book is divided in three parts. The first, constituting nearly two-thirds of the total, is the outgrowth of a series of lectures given in a training school for nurses. The treatment is moderately uniform. Chapters I, II and III, devoted to the throat, nose and ear respectively, give anatomy and physiology of the organ considered, followed by common diseases and treatment, and a few suggestions on nursing care. The general rules for post-operative care of tonsil cases are so well given as to make helpful reading for the young nurse so often assigned to the nose and throat service before she has had her class work on the subject.

Chapters IV-VII deal with the eye in such detail as to convince the reader that this is the writer's field of major interest. In Chapter VII there are photographs illustrating procedures described, a method so effective that one regrets that it is used but twice in the textbook. Chapter VIII is a miscellany of suggestions chiefly on nursing care which might well have been distributed among the preceding chapters at the points of logical relation.

Part II, *Operating Room Technic*, could be used in part in teaching or as reference reading for student nurses preceding service in the operating rooms. The lists of instruments for each operation and the labelled photographs would prevent much of the confusion and discouragement frequently afflicting the student in her first days of duty. This section could have been improved by a brief statement of the steps in each operation. Too often the nurse has only a vague idea of what the surgeon is doing and her efficiency suffers thereby.

Part III is planned "to be an aid to the school nurse as well as to the district nurse in solving eye, ear, nose and throat problems which come to them." While it contains many good suggestions it is scarcely adequate for this purpose, though well adapted to the needs of a student nurse in her public health nursing class.

The manual is easy to read, the paper and type are well selected, and the style is simple. There are faults in diction and the indexing is incomplete. The questions appended to each chapter might help the student test her own understanding, but are not of the type used by teachers trained in present-day educational methods. There are no references.

The reviewer would recommend the book for reference in the library of any school of nursing. The advisability of adopting it for a given school could only be determined by comparison of the texts available, and consideration of other factors peculiar to the individual situation.

HAZELLE BAIRD DOUGLAS

**Social Work Year Book**—By Fred S. Hall and Mabel B. Ellis. New York: Russell Sage Foundation, 1930. \$4.00.

The Russell Sage Foundation has undertaken the biennial publication of

a book which gives the progress of social work. This book is not intended to be an encyclopedia of social problems or social conditions. It does, however, outline in logical sequence the advance which has been made during the current year in the field of social service and public health, and frequently overlaps into the closely related professions of education and medicine.

This, the first volume of the series, outlines a background in which is presented historically the steps which have led up to the present status. The book has been prepared by special contributors who have worked under a supervisory committee. An attempt has been made to record recent events and developments including: first, laws passed on topics included in the volume; and secondly, reports collected by the leading social service organizations, community chests, welfare, health, and education divisions of the government.

There have been supplied over 400 laws and 2,300 reports collected on schedules covering 63 different fields of social work. The book contains also a valuable reference to all the national health and social agencies including the purpose and activities of each and the number who constitute its membership.

HENRY F. VAUGHAN

#### Occupational Disease Legislation.

*Report of Committee on Standard Practices in the Problem of Compensation of Occupational Diseases, of the Industrial Hygiene Section, American Public Health Association—By Henry H. Kessler, Chairman. New York: A. P. H. A., 1931. 124 pp. Price, \$1.50.*

This report represents material which has been gathered since 1927 and condensed and revised to the current period. Both national and international authorities are agreed that occupational diseases should be compensated on the same basis as industrial accidents. The

arbitration of claims, however, is much more difficult to settle, because diseases do not lend themselves so readily to interpretation and indemnification as accidental injuries. A proposal for legislative action concerning this situation should have for its basis the background of experience.

Beginning with a brief history of the extension of workmen's compensation laws to occupational diseases, the laws of some 15 European countries, Mexico, Central, and South America, and those of the British Empire are covered, often in tabular form. Then follow those of the Canadian Provinces, 7 of 9 of which have an enumerated list of compensable occupational diseases as well as state insurance funds. Compensation boards administer them.

For the United States, the provisions of workmen's compensation acts are quite completely discussed. These are of two kinds: The all-inclusive or "blanket" coverage law adopted by California, Connecticut, The District of Columbia, Hawaii, The Philippine Islands, Massachusetts, North Dakota, Wisconsin, and United States civil employees as well as longshoremen and harbor workers; and the specific schedule or list of diseases recognized as compensable, and adopted by Illinois, Minnesota, New Jersey, New York, Ohio, and Porto Rico.

A final section is devoted to annual reports of cases and costs in the various states and insular possessions of the United States. There is also a brief section on diseases resulting from, or aggravated by, accidental injuries, another upon medical and surgical care of injuries, and one upon the reporting of occupational diseases. A list of references and a very complete index follow.

This very timely compilation of occupational disease legislation and its results throughout the world should appeal especially to legislative and social agencies, employers, insurance com-

panies and labor organizations, and to all who are interested in improving or changing existing legislation to conform with modern progress and standards.

Much credit is due Eleanor Rantoul, a member of the committee, who gathered the original data and revised it in its present form.

EMERY R. HAYHURST

**Fundamentals of Health**—By T. Bruce Kirkpatrick and Alfred F. Huettner. New York: Ginn, 1931. 576 pp. Price, \$3.80.

This is a textbook of hygiene intended to stimulate the interest and stir the imagination of college students by including subjects such as the genesis of life, phenomena of reproduction, growth and development, endocrinology and immunology. Each chapter is thorough in the treatment of its subject matter, with clear illustrations and a list of references appended for further reading.

Chapter I deals with the evolution of man, tracing the Crô-Magnon type upwards to *Homo sapiens*. At the end of this chapter the aim of the book is stated as indicating how the human body may adapt itself to an ever changing environment by judicious habits of living.

Chapters IV and V present an excellent account, condensed yet exhaustive, of foods and nutrition. In Chapters VI, VII, VIII and IX the anatomy and physiology of the muscular, circulatory, respiratory, and excretory human systems are outlined with practical examples of preventing common disorders of these systems.

An account of the nervous system is given in Chapters X and XI with a discussion of its adjustments and interrelationships with the internal secretions.

The book closes with a chapter on the public health, in which some of the tables require revision, e.g., the infective organism of typhus fever is wrongly stated in Table XXVIII but correctly in Table XXX and *Leptospira icteroides* is erroneously stated as the causative organism of yellow fever.

Sundwall (*Am. J. Pub. Health*, Jan., 1927) has emphasized that the subjects in a college course of hygiene should embrace a study of the factors governing health promotion and disease prevention and control. In *Fundamentals of Health* the authors have presented a concise account of the factors included in both these groups. A careful perusal of this splendid textbook will interest the student in personal and community hygiene.

JOHN WYLLIE

## BOOKS RECEIVED

**MENTAL HEALERS.** By Stefan Zweig. New York: Viking Press, 1932. 363 pp. Price, \$3.50.

**PSYCHOLOGY AND PSYCHIATRY IN PEDIATRICS.** The Problem. Report of the Subcommittee on Child Health and Protection. New York: Century Co., 1932. 146 pp. Price, \$1.50.

**BODY MECHANICS: EDUCATION AND PRACTICE.** White House Conference on Child Health and Protection. New York: Century Co., 1932. 166 pp. Price, \$1.50.

**SOCIAL PROBLEMS AND SOCIAL PLANNING.** The Guidance of Social Change. By Cecil Clare North. New York: McGraw-Hill, 1932. 409 pp. Price, \$3.50.

**MEDICAL SUPERVISION AND SERVICE IN IN-**

**DUSTRY.** National Industrial Conference Board, 1932. 125 pp. Price, \$2.00.

**EXERCISE AND PHYSIOLOGY.** By A. C. Gould and Joseph A. Dye. New York: Barnes, 1932. 434 pp. Price, \$3.00.

**CANCER. WHAT EVERYONE SHOULD KNOW ABOUT IT.** By James A. Tobey. New York: Knopf, 1932. 313 pp. Price, \$3.00.

**THE CONTROL OF TUBERCULOSIS IN THE UNITED STATES.** By Philip P. Jacobs. New York: National Tuberculosis Association, 1932. 407 pp. Price, \$2.00.

**THE STORY OF MEDICINE.** From Medicine Man to Modern Physician. By Victor Robinson, 1931. 527 pp. Price, \$5.00.

**FEEDING A FAMILY AT LOW COST.** Chicago: Evaporated Milk Association, 1932. 15 pp.

# A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Hourly Nursing**—A brief account of an hourly appointment nursing demonstration in Chicago, a project of the Rosenwald Fund and a service with great possibilities.

AMES, M. Organized Hourly Nursing in Chicago. *Pub Health Nurs*, 34, 1: 17 (Jan.), 1932.

**Detroit's Diphtheria Study**—Not to be missed is this excellent account of the epidemiologic study made of recent diphtheria cases in Detroit. The paper is too good to be spoiled by a partial summary here.

ANON. Diphtheria Studies in Detroit. *City Health* (Detroit Department of Health), 15, 4: 4 (Nov.-Dec.), 1931.

**Diphtheria Immunization Results**—In Philadelphia, 55 per cent of the preschool children and more of the school population have been immunized against diphtheria, the incidence of which has been reduced 80 per cent. Of the cases occurring, 99.3 per cent are among unimmunized children. Bacteriologically, the disease is as virulent as ever.

BAUER, E. L. A Survey of Diphtheria Prevention in Philadelphia. *Am. J. M. Sc.*, 182, 6: 839 (Dec.), 1931.

**Medical Graduates and Hygiene**—Brief but illuminating comment on what candidates for medical licenses did with twelve questions on hygiene. None answered correctly the question: What is the sanitary code and by whom enacted?

BROOKS, P. B. Results of a Recent Hygiene Examination. *New York State J. Med.*, 32, 2: 70 (Jan. 15), 1932.

**More "Colds" Prophylaxis**—The results of this experiment in the prevention of colds with vaccine show little

if any improvement in the treated group compared with the control.

BROWN, W. E. Vaccine in the Prevention of the Common Cold: An Experiment. *Am. J. Hyg.*, 40, 1: 36 (Jan.), 1932.

**Whooping Cough Epidemiology**—Intensive observation of whooping cough cases as they developed in a rural group constituted an excellent opportunity to study attack rates among contacts.

BURROUGHS, T. P. An Epidemiological Study of a Rural Outbreak of Whooping Cough. *Quart. Bull. (Millbank Memorial Fund)*, 10, 1: 41 (Jan.), 1932.

**Typhoid Fever**—Typhoid carriers are still with us and will be for another quarter century. In the meantime, safeguards cannot be lowered and higher standards of personal hygiene must be maintained. A timely warning.

CUMMING, J. G. Should the Barriers Against Typhoid Be Continued? *J. A. M. A.*, 98, 2: 93 (Jan. 9), 1932.

**Hydrocyanic Acid**—This brief discussion of the cutaneous absorption of hydrocyanic acid gas will be valuable to those who have to use this fumigant.

DRINKER, P. Hydrocyanic Acid Gas Poisoning by Absorption through the Skin. *J. Indust. Hyg.*, 14, 1: 1 (Jan.), 1932.

**Pasteurization in Canada**—A Canadian symposium on pasteurization indicating that the Dominion sanitarians think with us, and not with the views on the subject expressed in journals published in England.

HARRIS, R. I., *et al.* The Menace of Raw Milk. *Canad. Pub. Health J.*, 23, 1: 1 (Jan.), 1932.

**Chlorine in Sewage**—The practical uses of chlorine in disinfecting sewage, controlling odors, overcoming

other plant operation difficulties, and conditioning sludge are discussed.

GOUDY, R. F. The Increased Use of Chlorine in Sewage Treatment. *Municipal Sanitation*, 3, 1: 10 (Jan.), 1932.

**Smoke and Cancer**—As a "horrible" example of fallacious juggling of crude statistics, this paper and its attendant discussion should be read by all who are tempted by the desire to prove a pet theory statistically. Smoke causes cancer, believes the author. For proof, she adduces such an irrelevant idea as this: the British housewife who cleans the soot from the grate and chimney pays the toll in breast and uterine cancer.

MUDIE, E. C. Air Pollution and the Rising Tide of Cancer. *J. Roy. San. Inst.*, 52, 7: 292 (Jan.), 1932.

**More Diphtheria Immunization**—British experience is reported in which none of the immunized children is known to have contracted typical diphtheria.

NASH, E. H. T., and BOUSFIELD, G. An Immunization Campaign and Its Results. *Med. Off.*, 47, 3: 25 (Jan. 16), 1932.

**School Health Administration**—Very practical is this discussion of the set-up and objectives of the school child health program, pointing out the many hurdles in the path to successful administration.

PERRIN, E. A Health Issue in the School Today. *J. Health & Physical Ed.*, 3, 1: 15 (Jan.), 1932.

**More Maternal Mortality**—Another worth while contribution to the discussion about the accuracy of maternal

death rates which suggests that the conditions are not as bad as the unanalyzed statistics would indicate.

RICHARDSON, B. K. Maternal Mortality. *Illinois Health Quart.*, 3, 4: 258 (Oct.-Dec.), 1931.

**Dental Defects and Sex**—More boys among the younger children and girls among the older ones had decayed, missing or filled teeth. A very much greater percentage of boys than girls had marked decay and more girls than boys had filled teeth.

STOUGHTON, A. L., and MEAKER, V. T. Sex Differences in the Prevalence of Dental Caries. *Pub. Health Rep.*, 46, 1: 26 (Jan. 1), 1932.

**Fertility Rates**—This study of the fertility rates of native white women in a rural area suggests evidence of unchanging fertility of native stock under a not greatly changing environment. Every health worker should see this bulletin if only for its exquisite format. He will return to his own publications to "read 'em and weep."

SYDENSTRICKER, E. A Study of the Fertility of Native White Women in a Rural Area of Western New York. *Quart. Bull. (Millbank Memorial Fund)*, 10, 1: 17 (Jan.), 1932.

**Cold Feet**—The concluding sentence of the summary of an important contribution to our knowledge of physiologic response to air temperatures reads: "So far as the work here reported may be significant, however, it does not confirm the general belief that chilling of the feet is specially harmful."

WINSLOW, C.-E. A., and GREENBURG, L. Vasomotor Reactions to Localized Drafts. *Am. J. Hyg.*, 15, 1: 1 (Jan.), 1932.

## NEWS FROM THE FIELD

### CANADIAN PUBLIC HEALTH MEETING TO BE IN TORONTO

THE Twenty-First Annual Meeting of The Canadian Public Health Association will be held in Toronto, May 25 to 27. The meeting will be held in conjunction with the Sixteenth Annual Meeting of the Ontario Health Officers Association.

### FIGHTING INFANT MORTALITY IN BOMBAY

THE commissioner of public health for all India reports that in 1928 the infant mortality rate in Bombay was 290 per 1,000 live births, according to the London magazine *Mother and Child*. To combat this serious condition and the high maternal mortality the maternity department of the Bombay municipality is maintaining 5 free municipal maternity homes in different sections of the city. The department also maintains milk stations at which milk is distributed free or at a nominal price. Plans are also being made to establish dairies in the suburbs to assure the city a purer milk supply. Most of the present supply is produced within the city limits.

The Bombay Infant Welfare Society includes in its activities 2 maternity homes, a crèche for children of industrial workers, and 8 infant welfare centers. These 8 centers also distribute milk at a nominal price. The government of the Bombay Presidency has established in the city three hospitals which have prenatal and postnatal clinics.

A month's leave on full average pay, both before and after childbirth, is granted to women factory workers by the Bombay Maternity Benefit Act. A

woman physician with the status of factory inspector looks after their interests. The draft of a bill which would compel the registration and supervision of midwives and provide for the appointment of a woman physician to administer the law as assistant to the health officer has been forwarded to the government by the Medical Women's Association of Bombay.—U. S. Children's Bureau, Washington, D. C.

### WESTERN BRANCH CHANGES MEETING DATE

THE Third Annual Meeting of the Western Branch of the American Public Health Association is now definitely fixed for June 9-11, in Denver, Colo.

### COST OF MEDICAL CARE

DR. BENJAMIN C. GRUENBERG, of New York, has accepted a temporary appointment to the staff of the Committee on the Costs of Medical Care.

Dr. Gruenberg has been granted a leave of absence by the Viking Press, New York, to take up his post with the committee. He has been educational editor of this publishing firm since 1929, prior to which time he was managing director of the American Association for Medical Progress.

The committee has completed practically all the preliminary research in its exhaustive 5-year study into the problem of "the delivery of adequate, scientific medical service to all the people, rich and poor, at a cost that can be reasonably met by them in their respective stations in life." Its final report will be published in the autumn of 1932.

NEW JERSEY HEALTH DEPARTMENT  
NEWS

NEW employees added to the staff of the New Jersey State Department of Health recently included: two district health officers, D. C. Bowen and Clyde R. Newell, of Freehold; three assistant sanitary engineers, Leigh W. Morrill, of Collingswood, Donald M. Ditmars, of Trenton, and Robert S. Shaw, of Lawrence Township; and two water shed inspectors, John H. Crabel, of Pennington, and Lewis W. Klockner, Jr., of Bloomsbury.

## FOOD RELIEF FOLDER

A FOLDER on emergency food relief and child health has been issued jointly by the U. S. Children's Bureau and the U. S. Bureau of Home

Economics, for the use of social agencies throughout the United States whose work it is to provide the food necessary to safeguard the health and growth of the children of the families in their charge. The importance of the adequate diet is emphasized in this folder, and much attention is given to what is stated to be the "irreducible amounts" of foods below which it is not safe to let the diet fall, even for short periods of time, with lists of minimum weekly quantities.

## NATIONAL NEGRO HEALTH WEEK

THE U. S. Public Health Service has issued a preliminary announcement on the Eighteenth Annual Observance of National Negro Health Week, April 3 to April 10, 1932.

## PERSONALS

DR. HENRY S. WELLCOME, of London and Washington, was knighted by King George and had his name included in the New Year's Honours List. Dr. Wellcome is now serving as Honorary President of the American Pharmaceutical Association.

DR. JAY ARTHUR MEYERS, member A. P. H. A., has recently been promoted from associate professor to professor of preventive medicine at the University of Minnesota School of Medicine, Minneapolis.

DR. VINTON A. SELBY, member A. P. H. A., of Clarksburg, W. Va., resigned recently as Health Officer of

Harrison County and was succeeded by Dr. Americus J. Kemper, of Lost Creek, W. Va.

DR. LINCOLN A. SUKEFORTH, member A. P. H. A., for 8 years Director of Public Health of Duluth, Minn., has retired.

DR. O. T. AVERY of the Rockefeller Institute, member A. P. H. A., has been selected to receive the first John Phillips Memorial Prize for 1932, which will be presented to him at the Sixteenth Annual Clinical Session of the American College of Physicians in San Francisco during the week of April 4, 1932.

## CONFERENCES

March 6-9, International Congress and International Exhibit of Sanitary Technique and Urban Hygiene, Lyons, France.

April 4-8, American College of Physicians, San Francisco, Calif.

April 11-15, American Nurses Association, San Antonio, Tex.

April 11-15, National Organization for Public Health Nursing, San Antonio, Tex.  
April 11-15, National League of Nursing Education, San Antonio, Tex.  
April 19-23, 37th Annual Convention of the American Physical Education Association, Philadelphia, Pa.  
May 9-10, American Association of Medical Milk Commissions, and the Certified Milk Producers' Association of America, New Orleans, La.  
May 10-15, Annual Congress of The Royal Institute of Public Health, Belfast, Ireland.  
May 15-21, National Conference of Social Work, Philadelphia, Pa.  
May 25-27, The Canadian Public Health Association, 21st Annual Meeting, in association with Ontario Health Officers' Association, Toronto, Ont.  
June 6-9, National Tuberculosis Association, Colorado Springs, Colo.

June 9-11, Third Annual Meeting, Western Branch, American Public Health Association, Denver, Colo.  
July 21-29, 1932, 100th Anniversary Meeting, British Medical Association, London.  
July, 1932, The Second International Conference of Social Work, Frankfurt.  
August 15-18, International Congress for Light, Copenhagen.

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### Ice Cream Sanitation and Control<sup>\*</sup>

F. W. FABIAN, PH. D., F. A. P. H. A.

*Department of Bacteriology and Hygiene, Michigan State College,  
East Lansing, Mich.*

DURING the past two years the ice cream industry has made rapid advances in sanitation and control. In this paper I shall attempt briefly to outline the most important of these.

Two significant changes have been made in the field of sanitation. The first is the reduction of the aging period of the ice cream mix from 24 hours and longer to 2-4 hours. It has been shown by several investigators that the longer aging period is unnecessary to produce the desired overrun, and the product is equal in every respect to that aged for 24 hours or longer. Since there is an increase in the bacterial content during the aging period, this decrease in time naturally lowers the count, other things being equal.

It has been recently discovered that the ice cream mix may be pasteurized at temperatures as high as 170° F. without materially affecting the flavor, texture, and body of the finished product. Temperatures up to 170° F. actually improve the whipping quality of the mix. One can readily appreciate the significance from a sanitary standpoint of increasing the pasteurizing temperature of such a viscous product. The higher temperature will materially reduce the bacterial content and greatly reduce the chances of pathogenic bacteria surviving. Pasteurizing temperatures of 140°-145° F. are common in the milk industry and have been almost universally accepted by the ice cream makers without any consideration as to the difference between the two products. There is no question that the minimum pasteurizing temperature for ice cream should be 150° F. for 30 minutes, while the maximum may be as high as 170° F. for 30 minutes.

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<sup>\*</sup> Read at a Joint Session of the Public Health Engineering and Food, Drugs and Nutrition Sections of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 16, 1931.

Other improvements in sanitation are the introduction of "dry ice," which enables retailers to distribute the product in an economic and sanitary manner, and the introduction of supplementary chemical sterilization—an important factor in reducing contamination from machinery, which may be an important source of bacteria in ice cream unless controlled.

The past year has seen considerable activity concerning ice cream legislation. There were 66 bills introduced in 37 states affecting the manufacture and sale of ice cream, exclusive of the general state revenue bills. Consideration of these will be confined to their bacteriological aspect.

California, in 1927, enacted a law establishing a maximum legal bacterial standard of 150,000 bacteria per gm. for ice cream. Three other states have taken similar steps during the past year. Connecticut has a maximum bacterial standard of 100,000 per c.c., Michigan 150,000, and Iowa 250,000 (packaged goods). Two other states had bills establishing bacterial standards before their legislatures (Minnesota 250,000 per c.c. and Nebraska 150,000 per c.c.), but they failed to pass. Connecticut and Michigan passed laws requiring ice cream mix to be pasteurized.

It is fairly safe to predict that during the next few years a majority of the states will enact laws establishing a maximum bacterial standard and greatly increase their existing sanitary requirements.

#### NUMBER OF BACTERIA IN ICE CREAM

There should no longer be any question about the ability of manufacturers to produce ice cream with a low bacterial content. Four sets of figures from 3 widely separated states and 1 province are presented for your consideration. Those presented in Table I were compiled through the courtesy of Frank E. Mott, Milk Inspector and Chemist of the Boston Board of Health.

Note the gradual improvement during 1926 and 1927, the sudden improvement for 1928 over the 2 previous years, and the high standards for 1929 and 1930. The great improvement in 1928 and subsequent years was due for the most part to regulations put in force September, 1928, and also to the establishment of a permit system, discussed later.

When California established a legal standard of 150,000 bacteria per gm., a complete survey of the state showed that only 55 per cent of the ice cream samples met the legal standards. The following data compiled by M. E. McDonald, Chief of the Bureau of Dairy Control of the California Department of Agriculture, show the progress made since then.

TABLE I

RESULTS OF BACTERIOLOGICAL EXAMINATION OF ICE CREAM IN BOSTON, MASS., OVER A 5-YEAR PERIOD

Total Samples Examined	Year				
	1926	1927	1928	1929	1930
	996	940	837	775	440
Colonies of Bacteria per c.c.	Per cent of Samples Examined				
Under 50,000	4.9	0.8	0.6	51.8	76.6
50,001 to 100,000	9.6	12.7	20.0	35.4	11.1
100,001 to 200,000	36.4	45.6	57.0	7.8	4.4
Total under 200,000	50.9	59.1	77.6	95.0	92.1
200,001 to 300,000	13.6	16.0	13.0	1.1	2.6
300,001 to 400,000	8.3	10.0	4.2	0.2	0.4
400,001 to 500,000	5.6	5.2	1.8	0.3	0.8
500,001 to 600,000	2.1	1.5	0.5	0.9	0.8
600,001 to 1,000,000	6.9	4.6	0.9	0.7	1.5
1,000,001 to 3,000,000	6.0	2.4	2.0	1.6	1.8
3,000,001 to 5,000,000	3.4	1.3	0.0	0.2	0.0
Above 5,000,000	3.2	0.0	0.0	0.0	0.0

	Per cent of Samples Legal
First survey, 1927-1928	55.0
Second survey, 1928	64.0
Total of all samples, 1929	70.0
Total of all samples, 1930	73.4
First 6 months of 1931	79.0

The above data are compiled on the basis of all samples from all factories in the state, including those making a million gallons annually, and those making only a few hundred gallons. Mr. McDonald states:

On a volume basis I feel safe in stating that 98 per cent of the ice cream manufactured in California is coming well within the limit of 150,000 bacteria per gm. . . . It is interesting to note that this improvement has been accomplished without the necessity of any legal action. The results of bacteria counts have in the past been used as a guide for detailed inspections rather than as a basis for prosecution. However, we feel that the manufacturers have had ample time to familiarize themselves with the necessary equipment and precautions essential to the manufacture of a quality product and we are using somewhat more drastic means of bringing about improvement.

In Table II are included detailed data from Los Angeles, Calif., compiled by William Veit, City Veterinarian and Director of Meat and

TABLE II

RESULTS OF BACTERIOLOGICAL ANALYSIS OF ICE CREAM OF LOS ANGELES, CALIF., DURING THE PAST YEAR

Colonies of Bacteria per c.c.	No. of Samples Examined	Per cent of Samples Examined
Up to 1000	143	19.2
1,001 to 10,000	336	45.2
10,001 to 50,000	146	19.6
50,001 to 100,000	38	5.0
Total under 100,000	663	89.0
100,001 to 200,000	26	3.5
200,001 to 300,000	14	1.9
300,001 to 400,000	10	1.4
400,001 to 500,000	5	0.7
500,001 to 1,000,000	10	1.4
1,000,001 to 5,000,000	15	2.1
Over 5,000,001	0	0.0
Total	743	100.0

Milk Inspection. They show the extremely low counts of much of the ice cream sold in that city.

Through the courtesy of Russell A. Palmer, Chief Milk Inspector for the Detroit Board of Health, the data in Table III were made

TABLE III

RESULTS OF BACTERIOLOGICAL EXAMINATIONS OF ICE CREAM IN DETROIT, MICH., DURING THE PAST SIX YEARS

Total Samples Examined	Year					
	1925	1926	1927	1928	1929	1930
	201	87	218	86	394	332
Colonies of Bacteria per c.c.	Per cent of Samples Examined					
Under 50,000	51.7	50.6	48.6	74.5	90.3	81.6
50,001 to 100,000	17.4	25.4	21.6	11.7	4.4	10.8
Total under 100,000	69.1	76.0	70.2	86.2	94.7	92.4
100,001 to 200,000	13.4	8.0	14.2	4.7	2.5	7.0
200,001 to 300,000	1.5	8.0	3.2	4.6	0.8	0.6
300,001 to 400,000	6.0	1.0	3.1	0.0	0.7	0.0
400,001 to 500,000	0.5	0.0	2.6	2.3	0.0	0.0
500,001 to 1,000,000	5.0	7.0	3.1	1.1	1.0	0.0
1,000,001 to 5,000,000	3.0	0.0	3.6	1.1	0.3	0.0
5,000,001 and over	1.5	0.0	0.0	0.0	0.0	0.0

available. They show the great improvement which has taken place during the past few years. Compare these with similar data secured by me in 1917, the first time an attempt was made to inspect the Detroit plants and analyze their product. At that time there were no samples that had less than 50,000 bacteria per c.c. and only one, or 0.86 per cent, below 100,000. Out of 116 samples, 64.66 per cent had 1,000,000 or more bacteria per c.c.

Table IV gives the results of bacterial analysis of 1,070 samples of ice cream during 19 months by the Toronto Board of Health, compiled by A. B. Moffat, Director of Laboratories of the Department of Public Health.

TABLE IV

RESULTS OF BACTERIOLOGICAL ANALYSIS OF ICE CREAM BY THE BOARD OF HEALTH, TORONTO, CANADA, JANUARY 1, 1930, TO AUGUST 26, 1931

Colonies of Bacteria per c.c.	No. of Samples Examined	Per cent of Samples Examined
50,000 to 100,000	820	76.6
100,001 to 200,000	120	11.2
200,001 to 300,000	28	2.6
300,001 to 400,000	37	2.8
400,001 to 500,000	12	1.1
500,001 to 1,000,000	34	3.1
1,000,001 to 5,000,000	15	1.4
5,000,001 and over	10	0.9
Total	1,070	100.0

#### WHAT IS A REASONABLE BACTERIAL STANDARD FOR ICE CREAM?

In view of the fact that legal bacterial standards in various cities of the United States range from 100,000 to 800,000, and in the 4 states which have legal standards from 100,000 to 250,000, per c.c. or per gm., as the case may be, it may be asked, what is a reasonable legal bacterial standard for ice cream? I would reply without any hesitation, 100,000 per gm. Some will consider this standard too rigid. They should be apprised of the fact that the health department of Shanghai, China, considers ice cream containing 100,000 bacteria or more per gm. as unfit for human consumption. However, the principal reasons for establishing this particular figure are:

1. A detailed study of one ice cream plant for 3 years which consistently (99.9 per cent of the samples) produced ice cream with a bacterial count of less than 100,000 during that period showed it was both possible and practical.
2. Experience with a large variety of plants shows that some produce ice cream with a low and some with a high bacterial content. To which class a plant belongs

depends entirely upon the sanitary practices employed. Almost without exception the samples showing high bacterial counts are from a few plants, in which the sanitary conditions are not what they should be.

3. There are great advances in ice cream manufacturing in both methods and equipment. Few industries have more elaborate equipment and machinery, designed in most cases with both utility and sanitation in mind. The influence of the improved methods will be reflected in the bacterial count. The most important of these are aging, pasteurizing, sterilizing and refrigerating. After it passes through the aging process ice cream is kept at or below the freezing point until consumed. While this may not destroy all types of bacteria, it certainly has a tendency to reduce the number of bacteria, and what is of equal importance, prevents the multiplication of most types.

When one considers that much of the milk produced and sold today in many cities comes well within the 100,000 bacterial limit, it is not hard to understand why this is a reasonable standard for ice cream.

Finally, additional data, not presented here, show that the bacterial counts for ice cream in other cities which have no bacterial standard or a very liberal one are far in excess of those in cities which have a very strict bacterial standard.

#### COLON GROUP AS AN INDEX OF SANITATION

There has been considerable discussion concerning the use of the colon group of bacteria as an index of the sanitary quality of ice cream. It is maintained by some that since this group are inhabitants of the intestinal tract their presence indicates fecal contamination and, therefore, potential danger.

The objections to the colon test are: (1) That it was designed primarily as an index of the sanitary quality of water where their number rather than their presence is used as the criterion; (2) that large numbers of colon organisms in ice cream or any other dairy product do not have the same sanitary significance as in water, since in milk and its products they tend to increase while in water they tend to decrease; (3) That there are 2 groups of closely associated bacteria, which may contaminate milk—the colon or fecal group found in the intestine, and the aerogenes or non-fecal group found in soil, grain, vegetable material, etc. The sanitary significance of the groups is entirely different; yet they are distinguished from each other only by special tests.

The consensus of opinion is that in order properly to interpret the colon test in ice cream or any dairy product, it is necessary to know the history of the sample; and further, it is not a reliable index of pasteurizing efficiency since there is considerable variation in the thermal death point of different strains and of the same strain at different times.

## SUGGESTIONS FOR SANITARY CONTROL

Experience has shown that there are several effective methods of control. The first is a law or ordinance. Some of the most important considerations of such a law or ordinance should be:

1. The type of raw materials which should be used.
2. It should not permit the reprocessing of ice cream mix.
3. It should define pasteurization—150° F. for 30 minutes to be the minimum.
4. A maximum bacterial standard should be stipulated—100,000 per gm. suggested as reasonable.
5. It should require a periodic medical examination of all those handling the product.
6. All plants manufacturing ice cream should be required to secure a license from the board of health, and, before such license is issued, be required to pass a rigid inspection. The license should be renewed yearly.
7. All those who sell ice cream should be required to obtain a permit from the board of health. Before the permit is issued, they should be required to pass an examination. The permit should be issued for a period of 1 year only.
8. There should be periodic inspection of all places manufacturing and selling ice cream. They should be inspected at least 4 times each year. The inspector should use a score card to evaluate each place. A copy of the score should be left with the person in charge with written instructions as to any alterations or criticisms.

## SUMMARY

The most significant changes from a sanitary standpoint are the reduction of the aging period from 24 hours or longer to 2 to 4 hours; the fact that ice cream may be pasteurized at temperatures as high as 170° F. for 30 minutes without affecting its quality, and the use of "dry ice" and chemical sterilization.

From the standpoint of control a few states are recognizing the value of bacterial standards for ice cream, 4 now having such standards. It is believed that a maximum bacterial standard of 100,000 bacteria per gm. is reasonable. Bacteriological data are given for 3 widely separate states and 1 province showing the progress being made in this direction.

Reasons for and against the colon test as an index of the sanitary quality of ice cream are given. It is generally agreed that it is necessary to know the complete history of the sample before the test can be of value.

Suggestions for the sanitary control of ice cream are given. They include the establishing of a law or ordinance defining the type of raw materials, pasteurization, and a bacterial standard. A license should be required for the manufacture of ice cream; a permit for its sale, and the periodic medical examination of those handling the product should also be required. Provision should be made for regular inspection of all establishments manufacturing and handling ice cream.

# Relative Pneumonia Fatality among Surface Workers and Miners\*

A Study of 2,603 Cases of Pneumonia and 238 Deaths from Tuberculosis in the Experience of the Tennessee Coal, Iron and Railroad Co., 1925 to 1930 Inclusive

C. H. KIBBEY, M. D., F. A. P. H. A.

*Director of Sanitation, Tennessee Coal, Iron and Railroad Co., Fairfield, Ala.*

THE inhalation of various forms of dust inherent in certain occupations and the possible relationship of dust deposit in the lungs to the frequency and fatality of pulmonary disease among certain classes of industrial workers has engaged the serious attention of industrial hygienists for many years.

Pneumonoconiosis has been recognized as a distinct pathological entity since the work of Ramazini (1703), who based his observations on the result of autopsies following death from, among other causes, miners' phthisis.

It has long been observed that pulmonary tuberculosis occurs with comparatively greater frequency in persons following some occupations than others. "Coal miners' phthisis" has been made the subject of much speculation as well as experimental study. Sir Thomas Oliver, one of Great Britain's leading industrial medical authorities, considers the terms "anthracosis" and "coal miners' phthisis" as synonymous, but quotes figures to show that coal miners do not die from tuberculosis with as great frequency as do "other occupied males."

In the United States "all other occupied males" (a somewhat comprehensive group which includes lawyers, physicians, carpenters, plumbers, etc.) exhibit a mortality rate from tuberculosis nearly 3 times as great as do coal miners.

The Illinois State Board of Health published (1927) figures which tended to show that coal miners in that state were the least liable

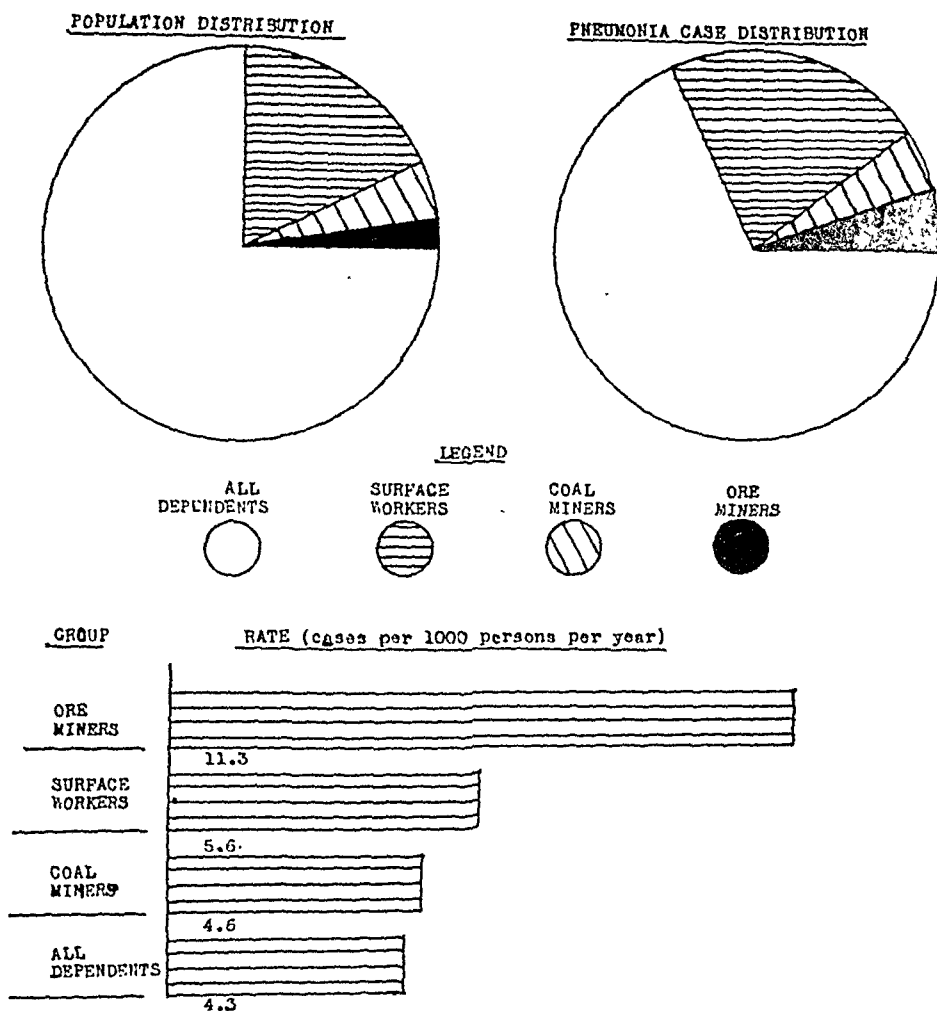
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\* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 14, 1931.



## CHART I

TENNESSEE COAL, IRON AND RAILROAD COMPANY  
Health Department  
Pneumonia Case Incidence in Relation to Population Groups



to respiratory diseases and death of any wage earning group, following the figures with the statement: "Contrary to popular belief, working in coal mines does not predispose to tuberculosis, pneumonia, influenza and other respiratory diseases."

In 1924, we showed a U. S. Government representative through some of our coal mining operations. He asked: "To what extent do your miners have anthracosis?" and upon being told that practically 100 per cent of them had the condition to an extent capable of being demonstrated with the X-ray, he wanted to know what our relative pneumonia fatality was among coal miners as compared to other workers.

The embarrassment occasioned by this experience has resulted in the present study, which is in the nature of a preliminary review.

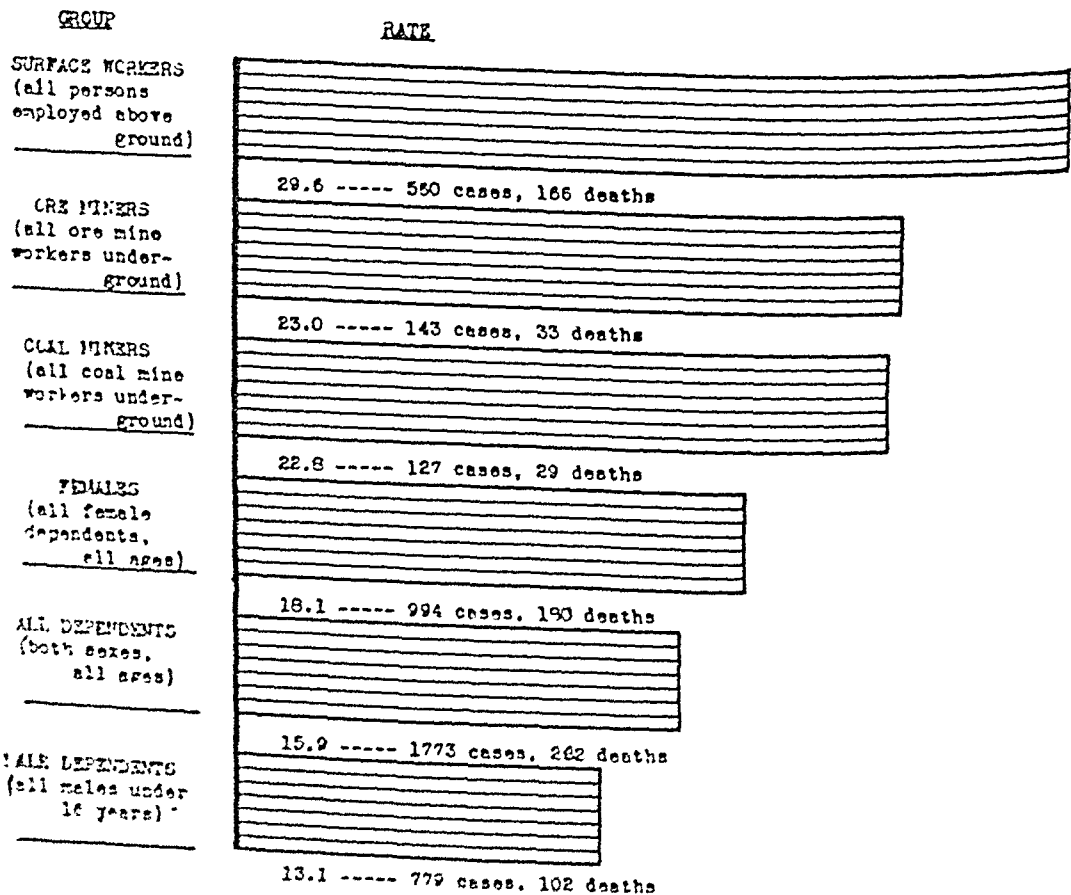
Our company operates several coal and red ore (hematite) mines;

employs more than 60 whole-time physicians; and maintains a 300-bed base hospital. Following the experience just mentioned, we began recording all cases of, and deaths from, pneumonia and tuberculosis. We have classified these according to age, sex, color and occupation, and present a tabulation comprising 2,603 cases of pneumonia, and 238 deaths from tuberculosis during 6 years, 1925 to 1930, inclusive.

For the purpose of this study all persons entitled to medical service have been divided into surface workers, coal miners, ore miners, female and male dependents. Each group has been again subdivided into white and colored.

The term "surface worker" applies to all employees, of whatever status, who work above ground, and includes clerks, accountants, superintendents, school teachers, nurses, and physicians. "Coal miners" will be understood to mean all coal mine employees who

CHART II  
TENNESSEE COAL, IRON AND RAILROAD COMPANY  
Health Department  
Pneumonia Fatality 1925-1930  
Occupational Groups  
(Rate in deaths per 100 cases)



work underground, including track men, motor men, safety men, mine foremen, etc. "Ore miners" is used to designate all ore mine employees whose duties keep them underground during the working shift. "Female dependents" means all unemployed females of all ages; "male dependents" all males 16 years of age and under.

Among the astonishing and apparently contradictory facts which our experience appears to disclose may be enumerated:

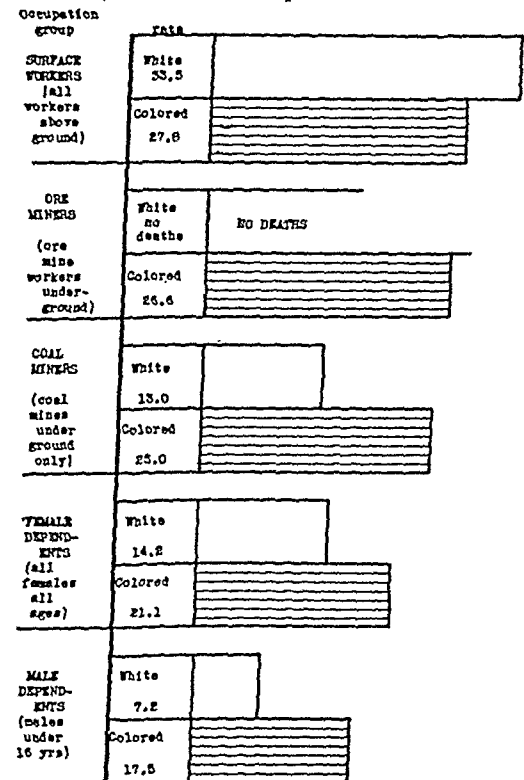
1. Our coal miners have a higher mortality rate from tuberculosis than any other wage earning group.
2. Of all wage earners those employed above ground have the lowest tuberculosis mortality rate.
3. The highest pneumonia case incidence rate is found among underground workers in the iron ore mines.
4. The lowest pneumonia case incidence rate and the highest fatality rate have occurred among surface workers.
5. No death has occurred from pneumonia during the 6 years in any white ore miner. (Only 19 cases have occurred in this group so that 1 more case might mean a 5 per cent fatality rate. The only other group which presents 19 successive cases of pneumonia without a death is white dependents "2 to 10 years.")

Population figures are estimated on the basis of allowing 3 dependents to each wage earner. This is considered conservative, as other population estimates have used a reciprocal of from 3.17 to 3.25.

It is interesting to note that while dependents constituted 75 per cent of our population, they gave only 68.1 per cent of pneumonia cases, and though surface employees made up only 17.9 per cent they contributed 21.5 per cent of the total pneumonias; coal miners comprised 4.9 per cent of the population and supplied exactly 4.9 per cent of the pneumonias, while ore miners supplied only 2.2 per cent of the population but 5.5 per cent of the pneumonias (see Chart I).

Expressed in another way, the ore miners gave an annual aver-

CHART III  
TENNESSEE COAL, IRON AND RAILROAD  
COMPANY  
Health Department  
Pneumonia Fatality, Comparative, Color, and  
Occupational Groups  
(Rate in deaths per 100 cases)



age of 11.3 cases of pneumonia per 1,000 ore miners; surface workers 5.6 per year per 1,000; coal miners 4.6 per year per 1,000; coal miners and all dependents a yearly case incidence of 4.3 per 1,000.

It will be observed that the annual case incidence for ore miners is nearly double that for any other group; surface workers come next, and of all wage earners coal miners suffer least.

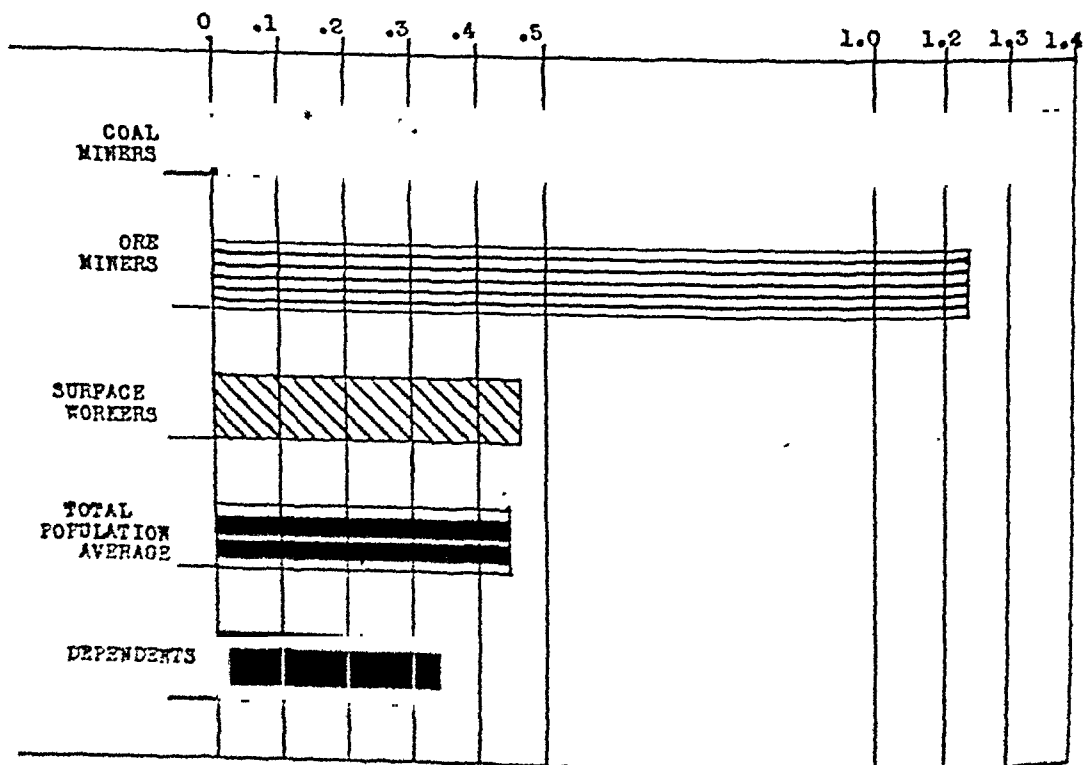
The story of pneumonia deaths presents an entirely different picture. The fatality rate expressed in deaths per 100 cases was found to be considerably higher for surface workers: 560 cases with 166 deaths, a rate of 29.6; ore miners 143 cases with 33 deaths, rate 23.0; coal miners 127 cases with 29 deaths, rate 22.8; female dependents 994 cases with 180 deaths, rate 18.1; male dependents 779 cases with 102 deaths, rate 13.1 (Chart II).

The frequency with which facts fail to agree with postulates proves the importance of the statistician to industry and the insurance business. Subdividing the groups into white and colored we are struck by another outstanding anomaly (Chart III). In each it will be noticed that the negro has the highest fatality rate with the exception of white surface workers, who have a fatality of 33.5 against 27.8 for colored. Colored ore miners have died at a rate of 26.6 per 100 cases

CHART IV

TENNESSEE COAL, IRON AND RAILROAD COMPANY  
Health Department

Tuberculosis Deaths, by Occupational Groups, 6 Years  
(Rates in annual deaths per 1,000 persons)



while no white ore miner has died. Colored coal miners have died at a rate nearly twice that of the white, 25.0 against 13.0. Among dependents, colored females present a rate of 21.1 against 14.2 for white; colored males 17.5 against 7.2 for white, more than double.

It was not intended to include in this report tuberculosis, but since some facts of interest may be brought out, tuberculosis death rates over the same period and for the identical groups are given (Chart IV).

Although coal miners presented the lowest pneumonia fatality rate of any wage earning group, our experience is that coal miners die from tuberculosis with nearly 3 times the frequency of the average for total population, and have a mortality rate more than  $2\frac{1}{2}$  times that of surface workers. Expressed in deaths per 1,000 persons per year the rates are: coal miners, 1.28, ore miners, 1.14, surface workers, 0.46, total population average, 0.44, dependents, 0.36.

#### CONCLUSIONS

That exposure to sudden and extreme temperature changes is a predisposing factor in the etiology of the pneumonias is, we believe, well established, and is the reason for the unusually high incidence rate of pneumonia among our ore miners—more than twice that of any other group.

In our operations several ore mine openings constitute a single operation. Each operation is provided with a large centrally located bath house at which men do their changing. These houses are constantly at temperatures around 80° F., and many of the miners must walk half a mile or more from mine to bath house. Coming from the mine as they do, in perspiration dampened clothing, they are in certain weather subjected to considerable chilling before reaching a bath house which is kept too hot. Leaving an excessively heated bath house they are subjected to a second chilling on the walk home or car line, which may be a mile distant.

Might not these facts more nearly account for the prevalence of pneumonia among ore miners than any condition under which they work, or the presence of possible pneumoconiosis? The fact that this particular group is more resistant to the destructive processes of pneumonia than are those in whom pneumoconiosis is absent would appear to argue the soundness of such reasoning.

Practically 100 per cent of our coal miners have anthracosis, but their pneumonia incidence rate has been exactly in proportion to their number in the entire population. A rate of 4.6 cases per 1,000, the

lowest of any wage earning group, compares quite favorably with 4.3 cases per 1,000 dependents, which includes all women and children. The fact that coal miners, in our experience, have exhibited the lowest pneumonia fatality of any wage earning group would appear to indicate that anthracosis has had no influence either as a predisposing factor or in contributing to fatality.

That the etiology of tuberculosis is in some way intimately bound up with calcium metabolism appears to be reasonably certain. Calcium metabolism, regardless of diet, is impossible in the absence of sunlight. May it be tentatively suggested that high death rates from tuberculosis among ore and coal miners might more reasonably be attributed to their deprivation of sunshine than to a condition which apparently does not influence other respiratory diseases?

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## Toxoid Now Supplied

EXPERIENCE having shown that in the immunization of young children toxoid has certain advantages over toxin-antitoxin, the department has for some time been supplying this agent for routine immunizations against diphtheria. By the method of preparation devised in the department's laboratories, the toxoid has a high degree of immunizing power and gives rise in young children to few disturbing reactions. It has, moreover, the additional advantage of containing no serum whatsoever, and cannot, therefore, bring about any sensitization to serum protein.

For the immunization of school children, the department still uses toxin-antitoxin, the mixture consisting of diphtheria toxin and the specific antitoxin derived from goats. The toxin-antitoxin is used there because the first immunizing injection can be made to serve also as a modified Schick test. As about one-half of the school children entering classes are immune, we find we are able by this manner of using toxin-antitoxin to reduce to as much as 50 per cent the children receiving the second and third injections. If we used toxoid we would be compelled first to give the older pupils the Schick test so as to avoid injecting such a large proportion of immune children. Unless otherwise specified, the toxoid will always be supplied. The manner of use of this preparation is the same as that of the toxin-antitoxin formerly used. The dosage is  $\frac{1}{2}$  c.c. if three injections are given and 1 c.c. if only two are given.

Park's studies indicate that with the toxoid now supplied three injections of  $\frac{1}{2}$  c.c. at weekly intervals bring about immunity to diphtheria in over 90 per cent of the cases, a somewhat higher proportion than is ordinarily obtained by the use of toxin-antitoxin. An interval of 2 weeks gives a slightly better result, but the difference is not sufficient to adopt this interval unless it is convenient.—*Weekly Bull., Dept. of Health, New York, 21, 5 (Feb. 6), 1932.*

# Tuberculosis in Young Females\*

W. J. V. DEACON, M. D., F. A. P. H. A.

*Michigan Department of Health, Lansing, Mich.*

IT is an axiom of public health that communicable disease cannot be controlled without knowing when, where, and under what conditions it is occurring. In regard to tuberculosis, as well as other communicable diseases, we know fairly well when and where deaths take place, but we do not know well enough the conditions under which these deaths are occurring.

That the tuberculosis rate has fallen enormously of late years is possibly too well known to need comment. In Michigan the rate of fall has not been so great as in the U. S. Registration Area, possibly because it was much below the registration area at the beginning of the century—195.2 per 100,000 in 1900, and 112.0 in 1920, a decrease of 42.6 per cent.

In Michigan the rate in 1900 was 102.4, or 47 per cent less than for the registration area. By 1920 it had fallen to 85.8, a decrease of 16 per cent, and by 1930 to 60.1, a decrease of 41.3 per cent from the 1900 rate, so that while the fall has not been so rapid, the ultimate rate for 1930 is much below that of the probable rate for the United States. The rate of fall by decades has been as follows: 1900–1910, 4.2 per cent, 1910–1920, 12.5 per cent, and 1920–1930, 30.0 per cent.

That this fall is not accidental is indicated by the rates for the past 10 years:

## MICHIGAN TUBERCULOSIS DEATH RATES PER 100,000

1921 .....	72.3	1926 .....	69.8
1922 .....	68.1	1927 .....	66.0
1923 .....	70.7	1928 .....	67.7
1924 .....	71.5	1929 .....	66.8
1925 .....	66.7	1930 .....	60.1

While there have been fluctuations, the trend has been steadily downward. In spite of this very satisfactory decline, the rate for young females is still much too high. There is, of course, a considerable variation in this factor between communities.

In Michigan the female rate has fallen, but it is still far higher between the ages 15 and 29 than the male rate. It is well recognized that there is a marked difference in the specific death rate for age in

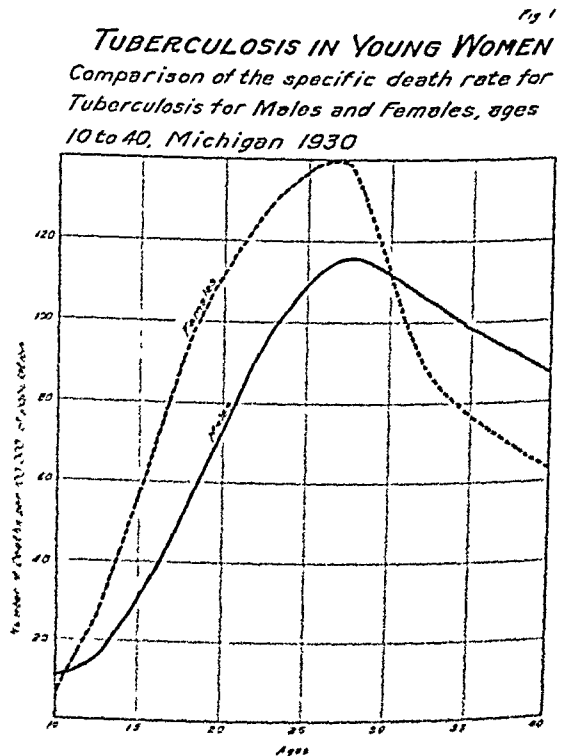
\* Read at a Joint Session of the Vital Statistics and Epidemiology Sections of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 16, 1931.

the two sexes. In the earlier age groups the rates are very similar for both sexes. Beginning, however, with age 10, the rate for females is higher than for males, with a gradually increasing difference until the age group 20 to 24, when it is greatest. From that point it shows some decline for 5 years, and from then on is distinctly lower than the male rate. Between 15 and 29, which is the group that we are attempting to study, the excess of the female over the male rate is very marked. This difference has been recognized and commented upon by many authorities.

From a biological standpoint the higher rate for females at these ages, covering the period of adolescence and early adult life, may be due to the great changes in the organs of the female body which would tend to lower resistance. The important developmental changes, both physical and psychic, that accompany puberty and maturity in females are immensely important factors. The dangers of childbirth must also be considered. The beginning of a disability with fatal termination for those who have an incipient or latent tuberculosis often dates from pregnancy.

This rate phenomenon has been under observation and consideration for some years. All sorts of reasons have been advanced, the most popular theory being that the difference is due to the increased industrialization of women. I believe we must regard most of these theories more as speculations and opinions than logical explanations.

For this reason we have undertaken a study of the occupation of females in this age group who died from tuberculosis, taking the statement on the death certificate in regard to occupation. It is fully realized that this type of study has very decided limitations because tuberculosis is a lingering disease. In many cases the statement "no occupation" conceals the fact that the person may have been gainfully employed up to the time of disability. It is our purpose to present the facts as they appear on the death certificates, supplemented by additional information obtained through a case study made with the assistance of the Michigan Tuberculosis Asso-





ciation. This association assigned one of its staff workers to conduct a field study of the deaths which occurred in 1929, which was comprehensive and gave valuable information.

During the years, 1927, 1928, 1929, and 1930, there were in Michigan 2,630 deaths of females between 15 and 29 due to tuberculosis (all forms). The certificates of 289 contained no statement of occupation, or the statement was too ambiguous to enable us to determine whether the person was gainfully employed. We have, therefore, eliminated these 289 and have considered only the 2,341 in which the statement of occupation was fairly clear. The occupations given were: school, 14.1 per cent, and home, 62.3 per cent—not gainfully employed; industry, 23.6 per cent—gainfully employed.

Of the 2,341 deaths, 1,787, or 76.4 per cent, were indicated as not gainfully employed; 554, or 23.6 per cent, were gainfully employed.

In considering these figures, it must be remembered that this age group of women undoubtedly represents that of greatest gainful employment. While we know of no figures that give the ages of employed women, we do know that among many large groups, such as the employees of the Michigan Bell Telephone Company, the average falls well within this age group. The average age of women employed by this company is 22. It is safe to say that the majority of women who are employed while in this age group are married and are in charge of their own homes by the time that they have passed out of it.

The occupation as given on all death certificates is notoriously inaccurate. Of the 289 certificates discarded, 133 gave "housework"

Fig. 2

### TUBERCULOSIS IN YOUNG WOMEN

The number of Females dying of Tuberculosis, ages 15 to 29, gainfully employed and not employed

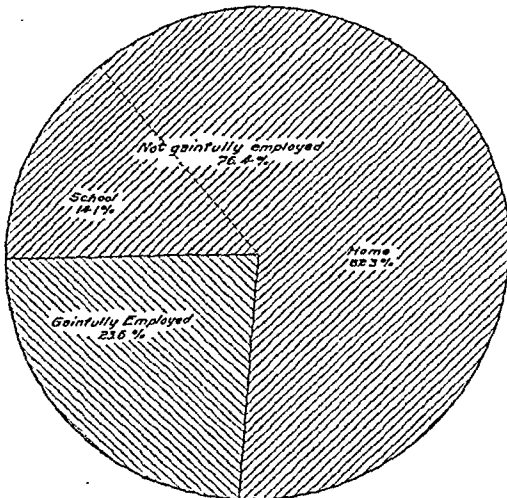
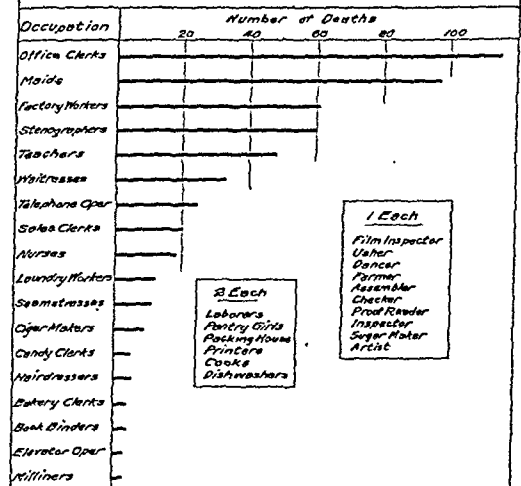


Fig. 3

### TUBERCULOSIS IN YOUNG WOMEN

The number of deaths of young women, gainfully employed, according to stated occupations



or "housekeeper." These terms are of no value because there is no means of knowing whether the persons were employed as housekeepers and doing housework for wages, or were simply housewives working in their own homes. An examination of such of the survey schedules as involved names in this group gave little additional information and failed to change the ratios indicated above.

The 1,787 persons not employed have been divided into 4 groups: no occupation 225, at home 306, students 329, and housewives 927.

The group listed as "no occupation," appear on the death certificates as "none," "unemployed," or "no occupation," but a considerable number of these may have been engaged in some gainful occupation prior to their disability, and in the younger age groups particularly more would have been in school.

The second group, "at home," are just as they appeared on the death certificates. It is probable that the statement in the preceding paragraph would apply equally well here. More than half of the unemployed are listed as housewives, and undoubtedly many in this group were in gainful occupations up to the time of disability or pregnancy.

The listing as "students" is, of course, satisfactory.

The survey schedules were studied for further information and resulted in the change of only 6 statements in this entire group. Where a history of previous gainful employment was brought to light, the case was removed from the unemployed category unless the employment was too remote to have been a possible influence on our findings.

It appears to us that there are two distinct reasons why a knowledge of the employment of women is desirable: (1) to know if the occupation *per se* is an influence on our mortality rates; (2) from an administrative standpoint to know where cases may be found in order that our program for control may be based on a definite foundation.

Of the 554 persons engaged in gainful occupations, there are represented 34 different types of work. Of these, 115, or about 21 per cent, are listed as office clerks. It is probable that more women are employed in this capacity than in any other, but aside from the fact that this is a sedentary occupation, possibly in poorly ventilated offices, we can see no reason for supposing that it would tend to lower resistance to tuberculosis. Occasionally offices are located in factories where there might be contact with fumes and dust, but any influence from these would be remote. The sanitary conditions in offices in which the individual spends about one-third of her time, are as a

whole, probably quite as good as in the average home, in which the other two-thirds are spent.

Next in numerical importance is the number employed as maids. This we regard as the most serious problem in the entire list, not because the occupation would have any deleterious effect on the women so employed, but because of the danger to others. Frequently there are young children in the home and in many cases the contact between the maid and the children is very close, with the constant potential danger to the children. I cannot too seriously urge the consideration of this important factor.

Under the term "factory worker" we have a number of women who are machine operators and do other light mechanical work, occupations which, for women, have grown enormously since the war, but from the large numbers known to be employed, it is probable that the rate is not exorbitant, though the possible harmful effects on women of the deleterious trades such as metal polishing must not be lost to sight.

Stenographers might have been included in the group of office clerks because the type of work is similar, but they are shown separately as that designation appeared on the death certificates. While office clerks, as stated above, may be scattered in small groups through manufacturing establishments, stenographers are usually in general offices where ventilation is liable to be better and working conditions more satisfactory.

Next in numerical importance come teachers. While I think many persons will argue that the possibility of infection from teacher to pupil is somewhat remote, the fact remains that most of us would seriously object to having our children in contact with a teacher who had an active tuberculosis, and most school boards will not employ one so afflicted. The number of deaths in this group is possibly not significant since there were only 48 in 4 years. There are about 30,000 teachers in Michigan in this age group, which would give a specific death rate of about 40 per 100,000, much lower than the rate for the entire group.

Next come waitresses. Here the objection would be based on esthetic grounds rather than on any real danger. There were 33 deaths in 4 years.

Telephone operators and sales clerks occupy the next two places, but it does not seem that the number of deaths is sufficient to represent anything more than an accidental incidence.

The ninth occupation is that of nurse. There were 8 deaths in the 4 years. There are more than 16,000 nurses and trained attend-

ants registered in Michigan, approximately 10,000 on the active list for 1930. It would seem, therefore, that this number hardly represents even a normal expectancy.

Of the other 25 occupations, the numbers vary from 12 to 1. In 10 occupations there were only 1 each and in 6 only 2. Table I gives the details.

TABLE I  
MICHIGAN DEATHS FROM TUBERCULOSIS IN 34 OCCUPATIONS

Office Clerks .....	115	Milliners .....	3
Maids .....	97	Laborers .....	2
Factory Workers .....	61	Pantry Girls .....	2
Stenographers .....	60	Packing House .....	2
Teachers .....	48	Printers .....	2
Waitresses .....	33	Cooks .....	2
Telephone Operators .....	24	Dish Washers .....	2
Sales Clerks .....	20	Film Inspector .....	1
Nurses .....	18	Usher .....	1
Laundry Workers .....	12	Dancer .....	1
Seamstresses .....	11	Farmer .....	1
Cigar Makers .....	9	Assembler .....	1
Candy Clerks .....	5	Checker .....	1
Hair Dressers .....	5	Proof Reader .....	1
Bakery Clerks .....	4	Inspector .....	1
Book Binders .....	4	Sugar Maker .....	1
Elevator Operators .....	3	Artist .....	1

Of the 2,341 deaths considered, we were able to secure histories from surviving relatives or others in about 400. Some of these were incomplete, or appeared unreliable, and were discarded, but in 340 the schedules were sufficiently complete for our use. These represent a fair sample, being quite evenly divided as to age, geography, and rural or urban.

Of these cases 64 per cent had sanatorium care at some time during their illness, but sanatorium care in itself does not represent much unless the facts as to the stage of the disease at the time they received this care, their length of stay, and subsequent history are considered. These could not be obtained with any degree of accuracy and as a result we must consider this item as one of interest rather than significance. The same applies to the question of medical service. The largest percentage of these cases (29 per cent) had the attendance of a physician for 2 years or more preceding death, while 25 per cent had care for 1 to 2 years; 17 per cent for 6 to 12 months; 23 per cent from 1 to 6 months; 6 per cent for 1 month or less. These figures simply indicate the continuous care immediately preceding death.

In relation to the conjugal state, approximately one-half were single (49 per cent), and the other half married or widowed. About 63 per cent of the married women had given birth to children and thus been exposed to those dangers incident to pregnancy.

A survey in regard to exercise indicated that about one-third took no exercise, the balance some, and in some cases too much.

In 63 per cent of the cases, it was stated that the patient wore warm clothing; in 21 per cent it was thought that the patient did not dress warmly enough, and in 16 per cent it was regarded as doubtful. As the question of sufficiency of clothing is often a matter of opinion, too much reliance should not be placed on these statements.

If we may regard education as a measure of the intelligence of the group, the following figures should be significant: 7.3 per cent had attended college, 34.2 per cent attended high school, and 58.5 per cent had finished or were in the lower grades.

Contacts, as indicated by family tuberculosis history, were definite in 33 per cent of the cases, and in the balance no history of direct family contact was obtained.

A careful study of the previous history of communicable diseases does not reveal anything of significance in the absence of a control group. For instance, 63.7 per cent of the cases gave a history of measles but we have no means of knowing that any other group which did not die of tuberculosis would not show as great or a greater percentage.

It is interesting to note remarks on many of the survey schedules in regard to pregnancy and influenza. There were many notations to the effect "poor health since influenza (1 year)"; "well until pregnancy (1½ years)"; "miscarriage, never well after"; "following influenza and pneumonia."

Just what effect influenza may have in the lighting up of old tuberculous lesions is an interesting question, but a study of these cases without a control group would be of doubtful value. There seems to be no doubt, however, that the strain of childbirth does lower resistance and the persistence of even slight illness following pregnancy should suggest very careful diagnosis and watchful care.

From this showing it must be very evident that industrialization is not an important factor in the mortality from tuberculosis among young women. Personally I can see no reason to believe that there is any more hazard involved when a young woman leaves her home, whether she goes to school or into an office, in most cases working not to exceed 8 hours under favorable sanitary environment. Whether we consider housewives, employed persons, or students, the problem is in the home and everyone who has experience in public health work realizes that this is the most difficult group to reach.

It is probable that more intensive work in the schools in the higher grades would be of value. Most efficient work is being done in the

lower grades for the control of all types of communicable diseases but there is a decided tendency to neglect the junior high school, the high school and the collegiate groups, and these are the groups that passing out of the schools go into the home and from which the excess mortality of the next few years is recruited. It is, of course, much easier to reach the group collectively in our educational institutions than in the home.

I referred to the developmental changes related to puberty and maturity as both physical and psychic. The physical changes while great, should be regarded as physiological and not pathological, but it is the psychic condition that accounts for such foolish fads as dieting, insufficient clothing, late hours, tobacco and alcohol, all or any of which may be factors in lowering resistance to disease. These habits can be improved only by education, and if our message can be carried into the higher grades while the mind of the student is still plastic we may reach the home of tomorrow, reap the harvest of saved lives, and the goal of lower death rates for which we are all striving.

We have tried to show that the problem is in the home. We have not offered a plan for reaching the home except the suggestion that work in higher grades of school be emphasized.

We are satisfied that gainful occupation *per se* is not a factor in the high rates for tuberculosis among young women, but we must consider the influence of certain diseases and of pregnancy in relation to these rates and this problem offers an inviting opportunity for research.

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## Germany: Prussia—Family Income and Infant Mortality

FOR the purpose of ascertaining the relation between family income and infant mortality a study was made in Prussia of 297,000 deaths in the 1st year of life which took place in 1913 and 1925–1929, inclusive. The deaths were divided into four groups according to the family income. Although the generally prevailing downward trend of infant mortality was observed in all four groups, there was a considerable difference every year in the four income groups. The infant mortality rate increased steadily for each group with the decrease in income; for instance, in 1913 from 66 per 1,000 live births in the highest income group to 214 in the lowest; in 1927 the figures were 36 and 142, respectively, and in 1929, 34 and 135, respectively.—*Arch. f. sociale Hygiene und Demographie*, Berlin, 6, 2: 89, 1931.

of each type per man per day in the individual prisons was calculated for each month and for the year, then the per man per day consumption for the 5 prisons for each month and for the year was calculated. Using these averages, adjustments were made, in consultation with Dr. Hazel K. Stiebeling of the Bureau of Home Economics, to furnish what may be considered a satisfactory diet not only from the point of view of nutrition but also of prison conditions. A schedule of food groups, type foods, and the amount of each type (Table I) was prepared for estimating the money value of food for federal prisons.

TABLE I

A BASIS FOR ESTIMATING THE MONEY ALLOWANCE FOR FOOD FOR FEDERAL PRISONS PER MAN PER DAY \*

Food Groups	Food Type for Price Basis	Amount lb.
Meats and fish.....	Beef	0.75
Fats.....	Oleo	0.15
Flours, starches, cereals.....	Flour, white	0.80
Dairy products.....	Milk	1.00
Eggs.....	Eggs (at 1 1/2 lb. per doz.)	0.03
Sugars and syrups.....	Sugar, granulated	0.25
Beverages.....	Coffee	0.10
Leafy, green and yellow vegetables and tomatoes.....	Cabbage	0.60
Roots and tubers.....	Potatoes	1.00
Beans and peas, dried.....	Beans, navy	0.10
Fruits, fresh or canned.....	Apples	0.15
Fruits, dried.....	Prunes	0.08
Spices.....	Salt	0.10
Miscellaneous food adjuncts.....	Yeast	0.015

\* These quantities of food could well be approximated on the average during a month. It is not expected that they will be met in detail each day.

These values were suggested after considering, as indicated above, the kinds and amounts of food eaten in federal prisons for over a year, the kinds and amounts that should occur in economical diets, and the kinds needed to lend palatability to an economical diet.

The contract prices of the various type foods have been applied to the actual quantities of various food groups eaten by prisoners and

TABLE II

THE COST OF THE RATION PER MAN PER DAY CALCULATED FOR TWO PRISONS ON THE BASIS OF THE PROPOSED RATION IN COMPARISON WITH WHAT WAS ACTUALLY SPENT, EXPRESSED IN DOLLARS

Prison	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1—Fet.* .....	.3330	.3232	.3324	.3415	.3332	.3243	.2989	.2963	.2873	.2501	.2519	.2480	.3017
Spent.....	.2897	.2539	.2522	.2627	.2861	.2827	.2572	.2722	.2667	.2400	.2561	.2398	.2633
Cor.† .....	.3093	.2859	.2750	.2840	.3044	.3010	.2795	.2945	.2905	.2623	.2659	.2482	.2834
2—Fet.* .....	.2732	.2818	.2817	.2763	.2893	.2946	.2411	.2335	.2859	.2809	.2113	.2025	.2627
Spent. . . . .	.3548	.4015	.3501	.3439	.3476	.3324	.3029	.3015	.3095	.2868	.3033	.3869	.3268
Cor. . . . .	.315	.346	.319	.324	.323	.323	.293	.292	.307	.262	.267	.270	.303

\* Without a 5-10% increase  
† Correction of amount spent to correspond to 0.75 lb. of meat

to the amounts of foods indicated in the schedule, and comparisons made between the two sets of data and the actual amount of money spent for food for 2 major prisons at monthly intervals throughout the year. The results for these prisons are contained in Table II.

The results agree roughly within 90 to 95 per cent of the actual money spent for foods. The greatest errors appear when there are variations in consumption of the leafy, green and yellow vegetables and the fruits. It is believed that the estimated cost of this schedule of foods plus a probable maximum of 10 per cent will amply cover the cost of food per man per day.\*

The value of this ration as indicated is:

Energy value, 3,955 calories

Weights of food constituents as grams per man per day

Proteins .....	140
Fat .....	116
Carbohydrates .....	545
Calcium .....	0.93
Phosphorus .....	1.62
Iron .....	0.028

With regard to the food types used for the calculation of prices, the foods selected are those that have occurred in prison diets most of the year and are used in relatively large amounts. There are two places where it may in the future be advisable to select a type of food for each quarter or half of the year rather than one type for the whole year in order to obtain a better evaluation of the cost of the rations—the leafy green and yellow vegetables, and fresh fruits. Seasonal variations in cost and consumption of the type food are particularly noticeable in these groups.

From our studies of prison dietaries and their composition,<sup>1</sup> we find three points that need especial attention: (1) palatability, (2) the uses of vegetables, and (3) the high phosphorus consumption.

Palatability plays an important rôle in any diet. In mass feeding where there is little individual choice of foods palatability becomes one of the prime factors in contentment. Palatability and attractiveness are attained through the use of the natural flavors of food, mode of preparation, or method of service. Meat has an appeal to most appetites and adds flavor to many bland dishes. It also represents a considerable proportion of the cost of any diet. The quantity of meat chosen for the ration,† 0.75 lb. per man per day, is somewhat

\* The calculation of the cost of the ration by the Bureau of Home Economics, U. S. D. A., at current lowest retail prices in 12 cities in the United States for March, 1931, showed a variation in cost of from \$0.462 in Detroit to \$0.320 in Kansas City (with a mode of \$0.36 to \$0.37). It represents therefore a moderately priced diet adequate in composition.

† The amount given represents all types of meat purchased, but particularly carcass meat.



less than appears to be agreeable to the average prison inmate. The quantity has been reduced only because the cost of a larger amount is not justified, especially with the increase in fruits and vegetables.

There is a need for greater use of vegetables in prison dietaries as carriers of salts and vitamins and also to introduce variety into the meal. The successful increase in the use of vegetables depends upon skill in their preparation or their combination with other foods. The errors of preparation are often those of overcooking or failure to reduce the vegetables to fragments that are appetizing. Adequate facilities for preparation and cooking are essential.\*

An economical diet containing considerable amounts of grains and meat is likely to contain a disproportion of calcium to phosphorus. The proposed inclusion of 1 pound of milk or milk products and the green vegetables has brought the ratio of calcium to phosphorus to approximately 1 to 2.† While we do not know the best ratio with any surety, it is probable that a wider ratio is not desirable. Milk is not especially effective in correcting the deficiency since its ratio is roughly 1:1. From certain aspects it appears desirable to add calcium carbonate or lactate under conditions where its presence will not be particularly evident, such as in bread, salt, or stews.‡

The classification of foods into groups has another use—as the basis for evaluating the character of the diet of prisoners. This general grouping of foods, with certain modifications, has been applied to the cost accounting system of the federal prisons so that each month's report contains in addition to the cost of food consumed the average weight per man per day of the various items, based upon the number of inmates assigned to the mess. For this purpose the groups were in some cases subdivided. Table III gives the grouping and code number for each of the groups. With the information obtained it will be possible to evaluate roughly the adequacy or inadequacy of the prison ration and to recommend modifications from month to month. An approximation of the chemical composition and vitamin content of the diet may be readily obtained. While carrots might properly be classified under the yellow vegetables it seems more logical to put them under the roots and tubers.

The evaluation of a diet on the basis of weights of food groups is subject to misinterpretation with regard to the variety of food offered

\* In the new federal institutions now under construction or projected the facilities provide adequately for diversified preparation and cooking.

† It is interesting to note that in the R. O. T. C. mess, included in Table IV, the ratio of calcium to phosphorus was approximately 1 to 2 in spite of the milk and vegetables used.

‡ We have found in connection with the Bureau of Home Economics, U. S. Department of Agriculture, that a palatable bread can be made with calcium carbonate in a potato flour prepared by the spray process.

TABLE III

CLASSIFICATION OF FOODS

.01 Meats and fish, canned Canned corned beef, canned salmon, canned sardines, etc..	.12 Potatoes and sweet potatoes
.02 Meats and fish, cured Bologna, corned beef, dried beef, frank- furters, ham, bacon, etc.	.13 Roots Beets, carrots, onions, parsnips, ruta- bagas, turnips
.03 Meats and fish, fresh Beef and veal, fish, mutton and lamb, pork, poultry and fowl, boned meats, etc.	.14 Leafy, green, or yellow vegetables Asparagus, beans (string), cabbage, cauliflower, celery, collards, corn (fresh and canned), cucumbers, eggplant, greens (mustard, rape, spinach, turnip), lettuce, peas (green and canned), pep- pers (green), pumpkin, radishes, rh- barb, sauerkraut, and squash
.04 Lard and cooking oil Lard, pure and substitute, and cooking oils, etc.	.15 Tomatoes and catsup
.05 Butter and margarines	.16 Dried beans, dried peas, and nuts
.06 Flours, starches, and cereals Barley, bran, bread, crackers, cream of wheat, corn flakes, corn meal, flours, grape-nuts, hominy and hominy grits, oat meal, puffed wheat and other wheat cereals, rice cereals and cornstarch, etc.	.17 Fresh fruits and berries
.07 Spaghetti, noodles, macaroni, rice as such, and vermicelli	.18 Canned fruits and berries
.08 Dairy products Fresh, canned and powdered milk, cheese, and ice cream, etc.	.19 Dried fruits
.09 Eggs Eggs, fresh and preserved	.20 Miscellaneous food adjuncts Ammonium carbonate, baking powder, coloring, cream of tartar, extracts, gelatin, baking soda, tiptopping, and yeast
.10 Sugar and syrup Sugar, syrup, jelly and similar foods	.21 Spices, relishes, and sauces Allspice, bay leaves, caraway seed, celery salt and seed, chilli pods, powder and sauce, chop suey sauce, cinnamon, cloves, cummin seed, curry powder, garlic, ginger, horse radish, mace, mustard, nutmeg, paprika, pepper, sage, salt, table sauce, thyme, vinegar, Wor- chester sauce, and pickles
.11 Beverages Coffee, tea, and cocoa	

unless some knowledge is had of the distribution of food substances within a group. Some idea of variety may be obtained from the menus. If those used do not prove satisfactory—and it is possible that a menu may be entirely misleading—then it may be necessary to resort to a special report on the variety of foods furnished under one or more of the various food groups. On the other hand, with a knowledge of the activities of a particular steward or cook it will seldom be necessary for special consideration.

Recently one of us has had the opportunity of examining the food consumption of a R. O. T. C. mess at the Field Medical Service School, Carlisle, Pa., under the supervision of Major Charles T. Spruit, M. C. The type of mess was such that there was probably more than the average consumption of vegetables and fruits. The data obtained for 2 weeks and also the Garrison Ration of the Army, are added, with the permission of the Surgeon General of the Army, in Table IV for the purposes of comparison with the proposed prison ration. With regard to the Garrison Ration it is recognized in the army that it

TABLE IV

WEIGHT OF TYPES OF FOOD CONSUMED BY THE R. O. T. C. MESS, CARLISLE BARRACKS, PA., JUNE 14-21 AND JULY 7-13, TOGETHER WITH SIMILAR DATA PREPARED AS A BASIS FOR RATIONING FEDERAL PRISONERS AND THE PRESENT GARRISON RATION

	R. O. T. C. June 14-21	R. O. T. C. July 7-13	Garrison ration U. S. Army	Proposed Prison
	lb.	lb.	lb.	lb.
Meat.....	0.65	0.73	1.38	0.75
Fats.....	0.12	0.09		
Butter and oleo.....	0.12	0.12	0.129	0.15
Beans.....	0.08	0.08	0.08	0.15
Flour and starches.....	0.90	0.26		
Bread.....	0.45	0.38	1.66	0.80
Dairy products.....	0.88	0.98	0.10	1.00
Eggs.....	0.18	0.27	—	0.03
Sugars and syrups.....	0.47	0.22	0.26	0.25
Leafy vegetables, etc.....	0.60	0.65		
Tomatoes.....	0.36	0.28	0.56	0.60
Roots and tubers.....	1.35	1.13	1.06	1.00
Fruits, fresh and canned.....	0.48	0.55	0.063	0.15
dried.....	0.002	0.18	0.16	0.08
Beverages.....	0.08	0.06	0.12	0.10
Spices.....	0.10	0.05	0.03	0.10
Food adjuncts.....	—	0.006	—	0.015

is not intended to represent the actual food consumption of a soldier but is a basis of determining an allowance of money with which food may be purchased for the mess. The value of certain items was increased beyond what the average man is likely to eat in order to supply additional money for the purchase of green vegetables and a variety of meats and other food. The Garrison Ration does not necessarily represent the most desirable distribution of quantities of food. The basis of estimating the cost of the army ration and the proposed prison basis of estimating cost differ in that the prison basis is intended to cover the actual cost of a diet that is adequate and permits a reasonable variety of food through varied methods of preparation rather than through a variation of kinds of food.

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# Experimental Poliomyelitis

## Its Contribution to Our Knowledge of the Human Disease\*

S. D. KRAMER, PH. D., M. D.

*Department of Preventive Medicine and Hygiene, Harvard Medical School,  
Boston, Mass.*

THE development of our knowledge of poliomyelitis begins with the separation of the clinical syndrome from unrelated but more or less crippling diseases. Heine, in 1840, and Medin, in 1890, gave us the first clear clinical pictures and, to a lesser extent, the pathology. Caverly's report of the outbreak in Vermont in 1894 and Wickmann's report of the Swedish outbreak in 1905 extended the earlier clinical and pathological observations and showed clearly that paralysis was preceded by a febrile stage. These authors pointed out that many cases did not result in paralysis and suggested the mode of spread of the virus. They were the first to indicate clearly that in many instances contact can be proved, thus giving us the beginning of our present concept of the epidemiology of the disease.

In 1909 Landsteiner and Popper succeeded in transmitting the disease to the monkey. This marked the beginning of progress in the experimental study. Landsteiner and Popper's work was quickly verified and extended by Flexner and Lewis, and Strauss and Huntoon. Infection in the monkey was first accomplished by intraperitoneal inoculation with a suspension of spinal cord from a human source, but it was soon found that this could be done in a variety of ways—intramuscularly, subcutaneously, intranasally, intrathecally, directly into the nerve sheath, and intracerebrally. This last remains the method of choice when positive infection is desired. The animals so inoculated develop a more severe form of the disease with almost 100 per cent fatal outcome, whereas those infected intranasally tend to a higher rate of recovery. Innumerable passages of the original human strains have now been carried over from monkey to monkey and the strains now employed in most laboratories are in large part passage from the

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\* The work on which this paper is based was supported by the Harvard Infantile Paralysis Commission, a fund privately donated to the Vermont Department of Public Health and a gift from the International Commission for the Study of Infantile Paralysis.

human material of a decade or more ago, although many new ones have been added.

That the infective agent of poliomyelitis belongs to the group of so-called filterable viruses is now almost universally accepted. The unseen agent not only passes readily through filters, but fulfils the more characteristic property of filterable viruses—their inability to multiply away from living tissue. Diligent search for organisms by many workers has failed to verify Rosenow's and Nuzum's findings. Except for the suggestive work of Flexner, Noguchi and Amoss and more recently of Long, Olitsky and Rhoads with the globoid bodies, all attempts to grow the virus outside of the living body have failed. In laboratory work, the virus is obtained by grinding a piece of the glycerolated cord, or of cord of a freshly killed animal, with fine sterile sand to which normal saline in the ratio of 1 gm. cord to 20 c.c. saline has been added. The suspension is then either centrifuged and the supernatant fluid used, or filtered through a Berkfeld candle.

The virus withstands glycerolation for years. Desiccation over KOH for weeks fails to alter the virulence appreciably. It is resistant to phenol in 0.5 per cent strength, but  $H_2O_2$  and  $HgCl_2$  have a destructive action, and heating at  $65^\circ$  for half an hour destroys it. Freezing temperatures as low as  $-2^\circ$  to  $-4^\circ$  C. for weeks do not affect it, and at  $4-5^\circ$  C. it can be kept almost indefinitely. Clark, Schindler and Roberts have recently found the virus to survive saturated NaCl solutions ordinarily destructive to living cells.

The virus is readily rendered non-infective by immune serum. The action of the immune substance does not seem to be of a virucidal nature, however, but simulates the toxin-antitoxin phenomenon of diphtheria. By means of cataphoresis the non-infective mixture of virus-immune serum can be dissociated, the virus migrating and concentrating at the anode, indicating an electronegative charge. That the neutralizing mechanism obtains for a short time at least in the animal body was shown by Olitsky, Rhoads and Long, who were able, by this method, to separate the virus from the cord of a recovered animal 23 days after infection, although the cord suspension before cataphoresis proved innocuous by intracerebral inoculation into normal monkeys. Burnet and Macnamara have recently suggested the existence of immunologically distinct strains of the poliomyelitis virus. They believe their Australian strain differs immunologically from the Flexner and Aycock strains. The paucity of data and the obvious differences in the virulence of the strains compared leave considerable doubt of the existence of any fundamental immunological differences in those studied.

The experimental disease in the monkey (*Macacus rhesus*) is a faithful clinical and pathological reproduction of the human disease. The monkey remains the one animal in which the human disease can be reproduced. Immediately following inoculation, the animal appears well and continues to act normally for several days. The first indication of infection is an elevation of the temperature of from  $1^{\circ}$  to  $3^{\circ}$  above the normal range of the animal, which varies between  $100^{\circ}$  and  $103^{\circ}$  F. The rise is constantly found and precedes the appearance of paralysis 1 to 3 days. Shortly after the rise of temperature the animal begins to refuse food and shows a disinclination to climb about the cage. About the same time, the fur becomes ruffled and frequently a tremor develops. After 24 to 72 hours the temperature reaches a maximum and then drops sharply. As the maximum is approached and reached, the animal shows obvious signs of illness, remaining hunched in a corner, the fur ruffled, tremor present, and food being generally refused.

Paralysis is usually first noted with the beginning of the drop in temperature. As in the human disease, the involvement of parts follows no rule and is characteristically haphazard. Paralysis may begin in either upper extremity and extend to all, or in one or both legs and extend upward, till the animal is completely paralyzed. With the appearance of the paralysis the animal becomes prostrated and the temperature becomes subnormal. At times a drop of  $6^{\circ}$  to  $10^{\circ}$  within 24 hours is observed. This severe involvement and collapse is noted in well over 90 per cent of animals infected by the intracerebral route and death follows in a few days.

Although with careful nursing life can be maintained for several days or weeks, death eventually occurs from asthenia or involvement of the entire breathing apparatus (intercostal muscles and diaphragm). Deaths due to cerebral and bulbar involvements have been described, but I have failed to observe such types in the past 5 years. Between 5 and 10 per cent of animals so infected recover with varying amounts of paralysis. Upon recovery they return to normal activity in a few days to a week or two, hampered only by a residual paralysis. The intranasal and other routes of infection yield a somewhat higher number of recoveries. As in the human disease, paralysis is frequently followed by deforming contractures.

The pathologic lesions found at autopsy are entirely analogous to those in the human form. Irrespective of any difference in the mode of infection in man, and the route of inoculation employed in monkeys, the lesions are characteristic and analogous. The outstanding characteristic lesions are found in the central nervous system. On

first view, the macroscopic changes are not particularly striking. The cord and brain show edema and congestion of the meninges. The edema of the cord may at times be somewhat more marked in some areas and appear patchy. On sectioning the evidences of edema are more pronounced—the substance pouts above the edges, has a darker gray-pinkish appearance and not infrequently minute hemorrhages are seen. The brain and pons show less involvement except for meningitis at the site of inoculation.

Changes in other parts of the body are not characteristic. Some cloudy swellings of the large parenchymatous organs are frequently seen and these changes also are observed on histological examination. The greatest changes outside the central nervous system are found in the lymphatic structures throughout the body. These are more readily noticed in the mesenteric lymph nodes, which are somewhat enlarged, and on section show necrotic areas and considerable edema and infiltration. This swelling often extends to Peyer's patches, and has given some ground to the notion of an intestinal route of infection.

The characteristic changes, however, are found on histologic examination of the cord and, to a lesser extent, parts of the brain. The lumbar and cervical segments usually present the greatest changes. In the early stages of paralysis a diffuse infiltration is seen involving both posterior and anterior parts of the gray matter of the cord. The type of cells varies with the stage of the disease, being in large part polymorphonuclear leukocytes in the earlier stages, soon replaced by cells of the lymphocytic series and microglial cells.

It is peculiar and striking that whereas the infiltration of phagocytic cells seems general, involving both the anterior and posterior parts of the cord, it is the anterior horn cells almost exclusively that undergo degenerative changes. The first change noted in the neurons is central chromatolysis, followed by complete solution of the Nissl substance. The nuclei and cytoplasm then swell and become very pale, and the nuclei disappear. At times the nuclei shrink, stain more darkly and assume an eccentric position in the cells. The cytoplasm then begins to stain irregularly, becomes reticulated and vacuolated and often contains several polymorphonuclear leukocytes. Granular degeneration follows, and all internal neuro-fibrillar structure is lost. With the onset of degeneration, neuronophagia proceeds. The site of the former neuron is soon filled by polymorphs, lymphocytes and glia cells. Very rapidly the polymorphonuclear leukocytes disappear and the microglia undergo enormous proliferation, these cells soon forming the bulk of the exudate in the gray matter, and are found clustered about the anterior horns indicating the former site of the neuron.

It has been suggested recently that our concept of the manner of attack of the virus on the anterior horn cells may be erroneous. Our belief, largely based on the work of Flexner and his coworkers, has been that the virus reaches the cord first through passage or propagation along the lymphatics and vascular system, thus reaching the nerve elements, and because of the resultant perivascular reaction the anterior horn cells suffer from ischemia and die.

In several recent publications, Fairbrother and Hurst renew the concept first promulgated by Leiner and v. Wiesner and present data based on histologic studies of the experimental disease to indicate that the action of the virus may be directly on the cells, and that this toxic action antedates the generalized infiltration and perivascular cuffing found at autopsy in human cases. The work of these authors, although carefully carried out, is yet to be confirmed. The researches of the earlier workers of the inter-passage of both virus and immune substances from blood stream to spinal fluid and in the reverse direction under specified conditions remain, however, convincing evidence of the importance of these fluids in transporting the virus from the portal of entry to the central nervous system.

Sufficient experimental evidence has been accumulated to indicate that the virus may readily enter the body through the nasal mucous membrane. The significance of these findings in the spread of the disease is obvious. In addition, epidemiological and immunological studies have consistently indicated contact and carrier factors in the spread of the virus.

It was found early that animals that had recovered from an attack resisted reinfection by any route. The time of the development of this protection varies. Although it has been observed in the acute stage of the disease it usually does not appear until a few weeks have elapsed.

The nature of this resistance was first shown by Landsteiner and Levaditi, who mixed the serum from a recovered monkey with the virus. They found that upon injecting a portion of this mixture containing an infecting dose of the virus intracerebrally into a normal monkey, the animal failed to succumb. Similar experiences were encountered when the serums of recovered patients were used in place of convalescent monkey serum. These findings have been confirmed many times and give us, within certain limits and when adequately controlled, an experimental test for immunity to the disease. By means of this test, it has been possible to carry on epidemiologic investigations comparable to studies in diphtheria by the Schick test. It has been possible, for example, to establish the incidence of im-



munity in the general population, urban and rural, in the south and north. It has also been possible to show a close correspondence between the epidemiology of poliomyelitis and other contact diseases, particularly with diphtheria the epidemiology of which is well established. By this test we have recently established the mechanism through which this extensive immunization of the population may be accomplished; namely, as in diphtheria, through a subclinical route. We have shown that the immune substance is passively transmitted from mother to new-born precisely as in diphtheria and measles. The neutralization test has been of inestimable value in establishing the epidemiology of poliomyelitis on a sound footing and has helped to clear up many of its mysterious aspects.

From the first observation that the serum of recovered animals and patients had an inhibiting action on the virus, efforts have been made to establish the therapeutic value of convalescent serum. Although the literature is replete with favorable reports, and we in Massachusetts have used it for the past 5 years with apparently favorable results, its value is not yet established. Nowhere in the literature is there evidence that the serum was employed in a critically controlled experiment, i.e., the treatment of alternate cases diagnosed in the pre-paralytic stage. In a disease such as poliomyelitis where the outcome varies within such wide limits, and the incidence and extent of paralysis is unpredictable, nothing short of an alternate case experiment on an adequate series can be used as conclusive evidence of the value of any therapeutic agent. We have ample evidence that the serum is not of absolute value even when administered in large quantities in the earliest pre-paralytic stages. Whether or not it is of *any* benefit in treatment of the disease is as yet in doubt.

In spite of doubt concerning its value, efforts to obtain an adequate supply and diligent search for an animal source of a hyper-immune serum have continued. Our findings of a high rate of immunity in normal urban adults, whose serum, so far as is known, is equal in potency to convalescent serum, might vastly facilitate the matter of supply.

Recently Pettit's immune horse serum experiment has been revived by Fairbrother, and Fairbrother and Morgan abroad, and by Weyer, Park and Banzhaf in this country, and in the goat serum of Howitt another source of immune serum may be made available. Efforts have been made to test the relative potency of these serums. The effort to obtain a large supply of immune serum is perhaps premature when it is borne in mind that the fundamental question of whether or not immune serum works at all has not been settled.

Convalescent serum therapy, however, needs no apology. The serum has a definite inhibiting effect on the virus and from this experimental evidence alone it represents the most logical form of treatment. The results of the therapeutic use of immune serum in the monkey have not been encouraging. We have shown that the animal goes through a stage quite analogous to the pre-paralytic stage of the human disease, and if the serum is administered in large doses during what seems to correspond to this, there is no apparent interruption in the course of the disease. The animal goes on to paralysis and death as do the controls. Furthermore, when the cords of the animals are tested, they still contain active virus. It might appear from such experiments that convalescent serum would have no effect on the human disease; but such a conclusion does not necessarily follow, for the reason that the experimental disease in the monkey is a far more severe infection than that seen in man.

More hopeful results are obtained in protection experiments. Flexner and his coworkers, in 1910, were able to protect animals for 24 to 48 hours by the intraspinal administration of human convalescent serum. Rhoads has recently obtained protection from infecting doses for as long as 6 days by a similar procedure. Weyer, Park and Banzhaf report successful protection by intramuscular administration of immune horse serum, but since they used the somewhat uncertain nasal route of infection and no detailed protocols are given, it is difficult to determine if all the experiments were conducted in a parallel manner. Since intranasal instillation of virus does not uniformly result in disease, in any experiment employing this route of infection parallel and adequate numbers of control animals are essential. In our own experience with intranasal infection over a period of years, we have come to realize the uncertainties of this method. Although nearly all animals can ultimately be so infected it cannot always be accomplished by 1, 2 or 3 instillations; at times many may be needed before a "take" is effected. Whether this variation is entirely due to potency of virus or whether individual differences in susceptibility are factors is not known.

A number of attempts have been made to determine the relative strength of the serums available—human convalescent, adult human, and immune horse and goat. Here again one is treading on uncertain ground. The technic of the test as first employed by Flexner and Lewis is, with slight variations, that employed by most workers. This consists of mixing a varying amount of 5 per cent centrifuged suspension or filtered material with varying amounts of the serum to be tested. They are well mixed, incubated at 37° C. for 2 hours, and

kept overnight in the ice chest. An amount of the mixture sufficient to contain the usual infecting dose of virus is inoculated intracerebrally.

A number of factors have militated against refinements in the original technic. One of the chief difficulties is in establishing and working with a minimal infecting dose of virus. An average monkey cord weighing 7 or 8 gm. is soon used up so that it is not possible to carry on a long continued series of experiments with a single specimen of virus. The virulence may vary with individual cords, which necessitates often repeated expensive titration of individual cords.

While the results of a titration of an unknown serum may be comparable and valid for any single experiment, they may not be at all comparable with those of a similar experiment in which another specimen of virus or serum is employed. That such errors may and actually do arise is seen in the independent attempts at titration carried out by Shaughnessy, Harmon and Gordon in Chicago, and Weyer and Park in New York on human convalescent and human normal serums. The former authors found what they thought was a significantly higher titer of immune substance in the normal human serum over the convalescent, whereas Park and Weyer maintain that normal serum has only one-half the neutralizing power. The protocols of both groups seem fairly clear-cut and may be valid for the conditions and reagents used, but it is obvious that their results were not comparable, and therefore could not be used for purposes of generalization.

We have attempted to carry out such titrations from time to time in the past 6 years and as the number of tests grew it was realized that both the technic and reagents were much too uncertain and variable to permit of generalizations. Unfortunately neither the technic nor the reagents have reached the refinement which would allow such precision of titration as is possible, for example, in diphtheria toxin and anti-toxin.

Successful experimental protection naturally raises the question of such protection in man. So far, the only convincing evidence of protection is observed when the serum is administered intraspinally (Flexner *et al.*; Rhoads). Whether intramuscular injections of immune serum give a passive immunity has not been proved.

Many attempts have been made actively to immunize the experimental animal. Because of the close analogies between the virus of poliomyelitis and that of rabies, attenuation of the poliomyelitis virus by drying was attempted a number of times. Landsteiner and Levaditi believed that they could immunize animals by the Pasteur technic, but others, notably Aycock and Kagan, found this method uncertain, a number of their animals coming down with the disease.

Other efforts have been made to attenuate the virus, some by heating for short periods of time (Abramson, Leiner and v. Wiesner, Landsteiner and Levaditi), or by exposure to the action of weak solutions of phenol. The results of these methods have been uncertain and hazardous—some animals were protected against subsequent infection, some failed to develop any protection, and others came down with the disease in the course of immunization. Aycock and Kagan found the safest and most constant results to be the multiple intracutaneous method, using an active virus. We have repeated these experiments many times, and recently Rhoads has successfully immunized animals by this route at a single sitting, injecting large amounts of virus over a large skin area.

Recent work with viruses indicates that they are not destroyed by the specific antiserum, but such serum acts as a neutralizer or inactivator, the phenomenon being similar to the neutralizing action of antitoxin on the toxin of diphtheria. It was found that this union could be severed by such simple procedures as dilution or filtration. For poliomyelitis virus the similar nature of the antiserum-virus combination was shown by Olitsky, Rhoads and Long, who were able to recover the virus in a potent form by cataphoresis from a neutralized mixture. The use of neutralized mixtures for the production of active immunity was first suggested by von Behring. Andrews, by employing neutralizing doses of virus and immune serum mixtures, was successful in producing immunity to vaccinia in rabbits; and Rhoads, by administering large doses of neutralizing mixtures of virus and immune serum intradermally, successfully vaccinated a certain number of monkeys against poliomyelitis (none of the animals, successfully vaccinated or not, showing any evidence of illness during the process). We have repeated these experiments, confirmed the results, and have developed a sufficiently high state of immunity to resist intracerebral inoculation of a large dose of a potent virus. Brodie and Goldbloom have reported successful immunization by a similar method.

Rhoads, utilizing the adsorption and inactivating properties of aluminium hydroxide, successfully immunized a series of animals by subcutaneous inoculations of the inactivated mixture. None of the animals showed any sign of illness throughout the vaccination. It appears, therefore, that we have available a safe, sure technic for the artificial production of immunity in experimental animals which may in time be developed into a suitable means for immunizing human beings. The advisability of such a procedure for universal immunization, in view of the low incidence of the disease, is problematical. Since the incidence of the disease, even in the worst outbreak, is seldom

over 1 or 2 per 1,000 population, any attempt to immunize against it would mean treating large numbers who would escape, in order to protect the few who would succumb. There is increasing evidence that physiologic differences in the host may be a large, or even a determining, factor in the outcome of an initial exposure to the infective agent. Too little is known concerning such physiologic alterations, and until more concrete data are obtained on this fundamental factor, it may be desirable to follow the orthodox procedure of active immunization if such a method can be safely applied. Although such a procedure might not be of general application during inter-epidemic years, it might be a useful weapon at the time of a severe outbreak.

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# Basic Records for Use in a County Health Department<sup>\*</sup>

JOHN COLLINSON, M. D., DR. P. H., F. A. P. H. A.

*Chief, Bureau of Vital Statistics, State Department of Health, Baltimore, Md.*

CERTAIN basic information is needed by a county health officer in order that he may organize his work intelligently and constructively, may handle emergencies as they arise, and evaluate results.

Suggested forms on which the necessary data may be recorded and summarized were submitted with the paper presented by the writer in Montreal. For convenience of arrangement the forms were grouped under the following headings:

- A. Communicable Diseases and Communicable Disease Control
- B. Prenatal and Maternal Care, Care of the Infant, the Preschool and the School Child
- C. Births, Deaths and Causes of Death

It is necessary that the health officer use the United States Bureau of the Census populations of his state and county, by age, sex, color or race, for the background of record keeping. Summarized records of reported notifiable diseases, of births, deaths and causes of death for the state and each county should be supplied him monthly by the state bureau of vital statistics to check the correctness of his records and for comparison.

A description of the forms submitted follows:

## *A. Communicable Diseases and Communicable Disease Control:*

1. Individual case card for the use of physicians. To be supplied in quantity to all physicians in general practice in the county, in order that they may report promptly to the health officer each case, or suspected case, of a notifiable disease attended, or brought to their attention.

2. Epidemiological record forms. Examples of forms for use in the investigation of diseases according to mode of transmission:

### *a. Naso-pharyngeal discharges*

Example—Diphtheria—Card includes a clinical history of the case, a census of

<sup>\*</sup> Abstract of paper read before the Vital Statistics Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 14, 1931.

the household, extra-household associations, suspected or positive cases of diphtheria in associates, prophylaxis and general environment.

*b. Excreta-borne*

Example—Typhoid fever—Card includes a clinical history of the case, a census of the household, general environment, details of patient's exposure to possible sources of infection, sources of food and water supply.

*c. Diseases of animals transmitted to man*

Example—Undulant fever—Card includes a clinical history of the case, census of household, general environment, places and kind of work and dairy products used.

*d. Insect-borne*

Example—Typhus—Spotted fever—Card includes a clinical history and examination of the patient, exposure to rodents and insects, census of household, home and occupational environment.

3. Tuberculosis

*a.* Examination and clinic report—Card includes the family history, previous history, present illness, and physical examination.

*b.* Individual case record—Card includes information on contacts and notes of visits by public health nurse.

4. Notifiable diseases, cases and deaths by month of occurrence. Tabular record form.

5. Reports of individual physicians, by months and years. Tabular record form.

6. Spot map for indicating location of cases of notifiable diseases.

7. Immunization record forms for protection against diphtheria, scarlet fever, and typhoid fever. Card includes record of authorization.

*B. Prenatal and Maternal Care, Health of the Infant, Preschool and School Child:*

1. Maternal History—Card includes history of previous pregnancies, prenatal and obstetrical care, postnatal visits and condition on discharge.

2. Infant Record—Card includes history of living conditions, kinds of food taken, illnesses and records of examinations, corrections and immunizations.

3. Preschool and School Record

*a.* Individual record—Card includes past history, findings on examinations, corrections and immunizations.

*b.* Summary of defects found and corrections made in each school. Tabular record form.

*C. Births, Deaths and Causes of Death:*

1. Forms on which to make exact copies of original certificates of births and deaths. These should be filed in the office of the health officer.

2. Cross index cards for births. These are useful in large counties.

3. Tabular record of live births; by attendant, color and month; with totals for current and previous year.

4. Monthly tabular record of deaths from certain causes and classes of causes; by color and age groups.

5. Monthly tabular record of infant deaths under 1 year (exclusive of still-

births) from leading causes and classes of causes; by color, sex and age periods.

6. Monthly summary of maternal mortality; by causes, by color and month, with totals for current and previous year.

7. Departmental record of individual physicians and midwives; giving the number of births reported by years and months.

NOTE: Because of the cost of printing, reproductions of the forms are omitted from this article. Copies can be obtained from the author upon request.

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## Mental Hygiene and the Depression

WHAT is the depression doing to the nation's mental health? Has there been an increase in mental diseases that can be ascribed, directly or indirectly, to prevailing economic conditions? There is a general feeling that mental and nervous maladjustments are now more widespread than ever, due to the anxieties, insecurities, fears, the mental stress and strain that naturally spring from unemployment and economic distress. And there is the belief that the seeds of much future mental disorder are being sown during this period of social and economic dislocation and lowered morale. What are the facts?

Inquiries made by mental hygiene agencies do not reveal a general rise in hospital admissions that can be readily interpreted in terms of the depression and there is perhaps little ground for pessimistic or alarming apprehensions in this connection. There is, rather, a feeling that the effects of the depression will not be apparent for some time to come—not until certain factors that usually enter into the precipitation of mental disorders have had time to operate. This is in accord with the understanding of modern psychiatry that mental diseases do not occur suddenly but develop gradually over shorter or longer periods of time.

"The present economic depression," Dr. Pratt states, "is taxing to the utmost man's adaptive possibilities and the difficulties of adjusting to new and painful situations find reflection in an interesting variety of community phenomena. Most, if not all, these phenomena are related to problems of human security. Every individual needs to develop a sense of security if he is to be an efficient community asset. This sense of security is an emotional state which permits one to attack the reality problems with which one is faced with a minimum of dislocated emotion. Such a feeling of security arises largely from the development of adequacies of skills and from a confidence in one's ability to deal capably with a variety of life situations."

To acquire this feeling of security, the announcement points out, man's personality as well as the environment in which he functions must contribute more to a feeling of security than to a feeling of insecurity. Among the most fundamental reality situations that threaten security it mentions those that menace the maintenance of life itself, as in war; great catastrophes; illness; and, for the present, the economic depression. Fear is the spectre that is taking the joy out of our lives at the present time. "Fear enters definitely into the whole picture—constructively at times, destructively at others. Fear becomes destructive when large masses of people are involved in distressing reality situations, such as unemployment and the necessary reduction in standards of living."—*Mental Hygiene Bull.*, 10, 1 (Jan.), 1932.



# EDITORIAL SECTION

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## PSITTACOSIS

A SEVERE outbreak of psittacosis came to our shores about 3 years ago as an unwelcome visitor. It was the object of many intense studies during which a number of laboratory infections with some deaths took place. We thought that it had been entirely eradicated, and possibly this was true. However, in December, 1931, and January, 1932, 12 cases occurred in the State of California, with 6 deaths. The cases were distributed over 7 counties, though 6 of them took place in 1 county. One fatal case was that of an inspector at the Port of Los Angeles, who had been boarding ships bringing birds from the Orient and the Tropics. His most likely exposure was to a number of parrakeets from one of these ships which he took to his home shortly before falling ill. As they had been destroyed when the facts became known, further investigation was impossible. One other case was due to a pair of parrakeets given as a Christmas gift. The birds appeared well, but laboratory examination proved that they were infected with psittacosis.

In addition, 3 cases, with 1 death, have occurred in New York City. The infection was traced in 1 case to a parrot which been put to board at a pet shop and became ill a few days after being taken home. Another case was an attendant at the same pet shop. It was shown that this shop had received a shipment of parrakeets from San Francisco in September. During October, 12 birds died, and some 40 were

sold. The others were sent to the Rockefeller Institute and psittacosis proved in several. One case has been reported from Oregon, due to parakeets from California.

To date (March 15) there have been 22 cases in California, with 8 deaths. The situation is more serious than would appear from the number of cases. Importation of parakeets might very well and fairly easily be stopped. However, certain sections of California provide ideal surroundings for the breeding and raising of these birds, and it has recently become quite an extensive industry there, in which some 3,000 poor people are concerned, in addition to about 1,500 dealers. If these breeding places in the state have become infected, the situation is complicated. So far the authorities have not been able to make a definite statement because dealers from whom infected birds have been obtained buy their stocks from various sources, and the birds are mixed. Circumstantial evidence points to importation of infected parakeets. Needless to say, strict quarantine has been imposed both on importation into and exportation from the state, until it is certain that the disease has been eradicated. The state authorities can be depended upon to protect the people of California as well as the rest of the country.

## THE DEPRESSION AND PUBLIC HEALTH

ONE of the most serious aspects of the depression is its effect on public health work. From all parts of the United States, as well as Europe, reports are coming in of curtailment of budgets, reduction in personnel, and limiting of projects, such as preventive campaigns against diphtheria, typhoid fever, etc. Many of our state boards are, as it were, living from hand to mouth, with only money enough to keep things going. Any aggressive work and excursion into new fields of prevention are out of the question. Publications are also hard hit, and there is little ground for optimism in sight.

It is futile to quote the great men of the past, statesmen, as well as scientists, to prove what health means to any nation. It required the World War to convince some of the foremost position which public health work should have in social organizations. In spite of this, it now looks as though another lesson is needed. Not that the governments of any state or country will deny the fundamental facts, but they do not seem to have that living faith which compels them to give to public health the position which it should rightfully have. We are not oblivious to the difficulties of the situation, but believe that it has been fully demonstrated in every part of the world that the "care of

the public health is the first duty of the statesman." Apart from physical and mental efficiency, which means good citizenship, there can be little doubt that the work of the Medical Section of the League of Nations has done more to bring about friendship between the nations and to promote peace than any other single agency.

The situation in this country is so serious that the Executive Board of our Association has felt compelled to call the attention of executives throughout the country to the dangers involved. There can be little doubt that the members of our Association, especially those engaged in active work of health administration, or in carrying out field projects, are keenly aware of the bad effects of curtailment of funds. Many of them are in positions to approach directly the appropriating bodies. Many others are not. It behooves our entire membership to exert all influence possible, direct or indirect, to give the public as well as appropriating bodies a clear understanding of what is involved. The following resolutions have been adopted and are being sent over the signature of the President to governors, mayors, Chambers of Commerce, and Federations of women's clubs throughout the United States.

*Resolution of the Executive Board of the  
American Public Health Association, Monday, February 8, 1932,  
on the Present Emergency in the Administration of the Public  
Health Departments of the States, Counties and Cities of the United States*

WHEREAS, the American Public Health Association is receiving from many sections of the country reports of contemplated or actual material curtailments of appropriations for personnel and facilities of public health service in states, counties and cities in response to the general effort towards reductions in governmental costs, and

WHEREAS, up to the present time, the health of the people has been year after year raised to higher levels, and maintained despite the unfavorable economic situation, this being in large part the direct result of the efficient health organizations that have been built up, and

WHEREAS, expenditures for the protection and promotion of the public health have heretofore been minimal, comparing poorly with expenditures for other public services of intrinsic merit, and, therefore, do not lend themselves to deflation without jeopardizing the health of the people, be it

RESOLVED by the Executive Board of the American Public Health Association, that every effort be made to maintain and even to advance the effectiveness of our health departments, and that the various agencies in the communities interested in the public health be asked to maintain unimpaired health budgets, trained personnel and services which have proved their worth in safeguarding the first wealth of every community—the health of its people.

For the Executive Board,

LOUIS I. DUBLIN, *President*

## TRANSMISSION OF MOSQUITOES BY AIRPLANES

IT is an axiom that human disease travels no faster than means of human communication. With the increased speed of communication due to steamships versus sailing vessels, express trains, and most recent of all, airplanes, the spread of disease has become easier, and it is a trite saying that we are now in close touch with every part of the known world—a matter of days and hours, when formerly it was months and weeks.

The discussion of the transmission of disease by airplane by the Permanent Committee of the International Office of Public Hygiene, was mentioned in our columns.<sup>1</sup> It was again an object of discussion at the meeting in Paris, May, 1931. It was recognized that though the conditions existing in the various countries were widely diverse, the provisions adopted corresponded to the general needs essential to sanitary defense and were a guarantee against any arbitrary action concerning international air relations, though that would not exclude legitimate intervention in times of immediate danger. The danger of infected people traveling by airplane has been lessened by detention and observation before embarkation, but there still remains the possibility of carrying infected insects, particularly mosquitoes. We are in close communication with the West Indies, the west coast of South America, Central America, Cuba, Panama, Mexico, and Jamaica, and there are three regular lines, daily and triweekly, between Miami, Fla., and the countries to the south of us, some of which were formerly heavily infected with yellow fever, and practically all of which harbor the yellow fever mosquito.

In view of the present situation and the certainty of increased airplane traffic in the future, officers of the U. S. Public Health Service have carried out a series of experiments on the transmission of mosquitoes by airplane.<sup>2</sup> From September 12 to September 18, 1931, more than a hundred inspections of planes from the southern countries were made on arrival at Miami. Twenty-nine mosquitoes were captured, the majority of which were non-disease-bearing, though several times *Aedes aegypti* were found, and once an *Anopheles*, showing that under natural conditions mosquitoes are carried considerable distances in planes.

To study the matter further, captured mosquitoes were stained with eosin and released in planes just before leaving.<sup>3</sup> Of 40 mosquitoes, nearly all *Aedes aegypti*, released in the cabin of a Fokker at San Juan, 13 were recovered in Miami, the distance traveled being 1,250 miles and time 9 hours and 53 minutes. In a second experiment, of 30 stained mosquitoes, 3 were captured on arrival at Miami,

and one was active during the trip, biting the radio operator when at an elevation of 3,000 feet. In a third experiment the pilot was bitten while in flight, and 6 mosquitoes were recovered at Miami. Altogether, in 3 experiments some 100 stained mosquitoes were released in the cabins of airplanes, and 22 of these were recovered in Miami, the distance traveled being 1,250 miles and the average time of the trip 10 hours and 10 minutes. There can therefore be no doubt of the potential danger of the carrying of infected mosquitoes by airplanes. However, planes may be freed from mosquitoes at points of departure by simple spraying, and the writers of the article quoted believe that there is no obstacle to the efficient treatment of airplanes for the destruction of mosquitoes and thus avoid the retardation of air traffic.

## REFERENCES

1. *The Airplane and Yellow Fever* (editorial), *A. J. P. H.*, 20, 11: 1221 (Nov.), 1930.
2. *Pub. Health Rep.*, Nov. 20, 1931.
3. *Pub. Health Rep.*, Nov. 13, 1931.

*Sixty-first Annual Meeting of the A. P. H. A.  
Washington, D. C., October 24-27, 1932  
Headquarters, Willard Hotel*

# ASSOCIATION NEWS

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A. P. H. A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

### *Health Officers' Section*

- Hainan C. Busby, M.D., Columbia, Tenn., Director, Maury County Health Unit  
Edwin H. Coachman, M.D., Court House, Muskogee, Okla., Superintendent of Health, Muskogee County  
Robert S. Cowles, M.D., Greeneville, Tenn., Greene County Health Officer  
Robert B. Griffin, M.D., Ripley, Tenn., Lauderdale County Health Officer  
D. Dick Howser, M.D., Fayetteville, Tenn., Director, Lincoln County Health Unit  
William W. King, M.D., Elizabethton, Tenn., Director, Carter County Health Unit  
Charles L. Low, M.D., Bellport, N. Y., Deputy Commissioner of Health, Suffolk County Department of Health  
Charles W. MacMillan, M.D., Health Centre, 134 Sydney St., St. John, N. B., District Medical Health Officer  
Edward L. Merritt, M.D., 130 Rock St., Fall River, Mass., A. A. Surgeon, U. S. Public Health Service  
John Y. O'Daniel, M.D., Dayton, Tenn., Director, County Health Unit  
Juan Arruza Perez, M.D., Box 90, San Juan, P. R., Head of Public Health Unit at Guayama  
Frank L. Roberts, M.D., Trenton, Tenn., Health Officer  
William C. Sanford, M.D., Cleveland, Tenn., Director, Bradley County Health Unit  
Floyd P. Smith, M.D., Trenton, Tenn., Assistant Health Officer, Gibson County  
Cecil B. Tucker, M.D., Knoxville, Tenn., Epidemiologist, City Health Department  
James B. White, M.D., Crossville, Tenn., Director, Health District No. 5  
Robert B. Wolford, M.D., 1300 7th St., Wichita Falls, Tex., City Health Officer  
M. V. Ziegler, M.D., State Board of Health, Raleigh, N. C., Surgeon, U. S. Public Health Service

### *Laboratory Section*

- Thelma M. DeCapito, University of New Mexico, Albuquerque, N. M., Bacteriologist, State Public Health Laboratory

- Vera E. Lautenschlager, Box 709, Reno, Nev., Acting Director, State Hygienic Laboratory

### *Vital Statistics Section*

- Carolina R. Randolph, State Health Department, Nashville, Tenn., Technical Assistant  
Robert H. White, Ph.D., 2211 Highland Ave., Nashville, Tenn., Associate Statistician, State Department of Health

### *Public Health Engineering Section*

- James T. Anderson, Humphreys County Health Unit, Waverly, Tenn., Sanitary Inspector  
B. G. Barfield, 2216 Murphy Ave., Nashville, Tenn., Field Assistant in Sanitation, State Health Department  
James W. Barnes, Greene County Health Department, Greeneville, Tenn., Sanitary Inspector  
T. B. Link, Maury County Health Unit, Columbia, Tenn., Sanitary Inspector  
Ray G. Nebelung, Charlevoix, Mich., Sanitary Inspector, Department of Health  
Charles D. Pearson, Shanghai Waterworks Co., Ltd., Shanghai, China (Assoc.)  
Grover C. Reid, Gibson County Health Dept., Trenton, Tenn., Sanitary Officer  
P. R. York, Lincoln County Health Unit, Fayetteville, Tenn., Sanitary Inspector

### *Industrial Hygiene Section*

- Henry S. Brown, M.D., 9101 Hamilton Ave., Detroit, Mich., Medical Director, Michigan Bell Telephone Company

### *Public Health Nursing Section*

- Olive H. Anderson, Blountville, Tenn., Staff Nurse, Sullivan County Health Department  
Kate B. Britt, R.N., Rutherford County Health Department, Murfreesboro, Tenn., Staff Nurse  
Julia V. Cochran, 613 Radcliffe Ave., Pacific Palisades, Calif., Public Health work in schools of Santa Monica  
Myrtle Dye, R.N., Rutherford County Health Department, Murfreesboro, Tenn., Staff Nurse  
Elvie M. Hopton, R.N., Shelby County Health

Department, Memphis, Tenn., Staff Nurse  
Malvina G. Nisbet, R.N., State Health Department, Nashville, Tenn., State Supervisor of Nurses

Dorothy Peacock, R.N., State Department of Health, Nashville, Tenn., Staff Nurse

Elisabeth M. Phelps, R.N., 2101 20 Avenue, S., Nashville, Tenn., Supervisor of Nurses, Davidson County Health Department

Julia R. Robertson, R.N., Monroe County Health Unit, Madisonville, Tenn., Staff Nurse

Hattie Shoemaker, R.N., Kingston, Tenn., Roane County Nurse

#### *Unaffiliated*

Manning Elovzin, M.D., 8356 Cloverlawn, Detroit, Mich., Student (Assoc.)

Ernest G. Smith, State Department of Health, Nashville, Tenn., Dental Clinician

Hyman I. Spector, M.D., 35 Municipal Court Bldg., St. Louis, Mo., Tuberculosis Controller

Ruth C. Warwick, M.D., Westmoreland Depot, N. H., Health Officer

#### DECEASED MEMBERS

John J. Griffin, M.D., Sault St. Marie, Mich., Elected Member 1916, Fellow 1922

W. H. Hattie, M.D., Halifax, N. S., Elected Member 1913, Fellow 1922

F. D. Bell, Montclair, N. J., Elected Member 1907

Robert W. De Forest, New York, N. Y., Elected Member 1912

Alfred Seale, Palo Alto, Calif., Elected Member 1930

Arthur C. Selmon, M.D., Battle Creek, Mich., Elected Member 1931

William F. Williams, M.D., Bristol, R. I., Elected Member 1920

Arlington Pond, M.D., Cebu, P. I., Elected Member 1915, Fellow 1923

Trent Stout, M.D., Pierre, S. D., Elected Member 1929

## LETTER FROM GREAT BRITAIN

### CONGRESS OF THE ROYAL SANITARY INSTITUTE

THE invitations to local health authorities and other bodies to appoint delegates to attend the annual congress of the Royal Sanitary Institute, at Brighton from July 9 to 16, have now been issued, and the effect on the attendance that may result from the present stringency is causing some anxiety in certain minds. Almost invariably it is the practice of authorities sending representatives to make themselves responsible for the payment of expenses, and in places where accounts are subject to government audit, the payments are permitted, provided the Minister of Health agrees.

In ordinary years the Minister permits the Institute to announce, in the invitation to attend, that he is prepared to approve the expenditure of one or two delegates, and at the audit no further evidence of approval than this is required. On the present occasion,

permission to appoint delegates and pay their expenses has not been given generally, but must be sought by each authority individually and must be supported by reasons for desiring to make the appointment.

From the form of the wording of a letter on the subject from the Ministry it is believed that permission is not likely to be withheld in any case, and that the Minister and his department generally are as anxious as health authorities and their officers to insure the success of the meeting, and that as many as possible of those engaged in health work shall have the opportunity of getting together and discussing health problems and the effect upon them of present conditions.

Brighton, the venue of the meeting, is a famous health resort and a great convention center. The local council is one of the most progressive health authorities in the country, and for this, among other reasons, will be seriously

disappointed if the meeting is not a magnificent success, attracting delegates not only from Great Britain but from overseas and from other countries. The average attendance at the congresses is about 1,400 or 1,500, and the Council of the Institute naturally hope that this figure, at any rate, will be reached. As President of the Institute, that body has recently elected Lord Balfour of Burleigh, who has devoted great attention to municipal government on the public health side particularly. The family name of Lord Balfour, it may be of interest to note, is Bruce, and he claims descent from Robert the Bruce, the Scottish monarch, whose observations on the habits of the spider are still quoted with approval in books treating of the history of Scotland.

#### SALARY CUTS IN THE HEALTH SERVICE

The possibility exists, of course, that some authorities may refuse to send representatives to the congress in order to use it as one of the means of securing some part of economy to be credited to the works done in relation to public health. The amount would, naturally, be trivial but speaking generally the economies that can be made in health expenditure cannot amount to much. They are, indeed, so small as to be hardly worth troubling about, more particularly as the effects they produce are out of all proportion to the money saved.

This, as a fact, is true of many of the economies suggested or adopted by local government bodies. Particularly is it true of the salary cut method. This, which was recommended as a gesture by the Ministry of Health, appealed very strongly to a number of authorities, who saw that it was put into operation almost immediately. At present about half the areas in the country are affected. In the places in which it is not in operation those who favor it urge its adoption in the face of

evidence that the deductions made are totally inadequate to bring benefit to anybody or to do more than cause irritation and inconvenience and hardship to those who must suffer them. So far as the public health service is concerned—or certain sections of it, anyhow, the medical officer of health and the sanitary inspector in particular—the position is peculiar. Having security of tenure these officers can only have their salary reduced if they consent. If they refuse they are at liberty to resign. They may not be discharged without good cause and subject to the consent of the Minister of Health. No difficulties have arisen over discharges up to the present and it is doubtful if they will, since no authority probably will take the risk of discharging a health officer for failing to offer or refusing to accept a salary cut, much as some of them would like to do so.

#### LONDON AND ITS FOGS

Though at the back of his mind he appreciates the seriousness of fogs from the health and economic point of view, the Londoner is always ready to jest about them and to laugh at rather than resent the action of the American film producer who, when he must show London, inclines to represent it in a state of more or less complete darkness.

One of the reasons why the Londoner has laughed, recently at any rate, has been because of a conviction that things have been improving to such an extent that presently the "London particular" would be a thing of the past. How wrong he has been and how justified the film producer, is shown in the report of the Department of Science and Industrial Research on observations made during the year ended March 31, 1931, in connection with the investigation of atmospheric pollution that has been going on for the last 17 or 18 years. The observations upon which the report is based were carried out in a



large number of centers throughout the country, and in practically every instance the results show that considerable improvement has taken place, the amount of impurity deposited being greatly reduced.

From the records it does not appear that London has shared at all in the general improvement. The unfortunate Londoner, indeed, is warned that from all appearances "as regards impurity suspended in the atmosphere, it seems probable that London may have to put up with black fogs for many years to come." And to make matters worse, he is told by the reporters that they cannot understand where "the general optimistic belief in the reduction of smoke fogs" has come from.

Even after such knock-down blows it is improbable that the Londoner will abandon his optimism. In spite of his coughing ("Britons," said the American writer, "never, never shall be slaves—except to their catarrh"), and in spite of investigators, he will aver that there are fewer fogs and they are nothing like what they were when he was a boy. "And in any case," he will add, "there is always May; and in London in May, fogs are soon forgotten."

DR. PARLANE KINLOCH, SCOTTISH  
DEPARTMENT OF HEALTH

By the death of Dr. Parlane Kinloch,  
Principal Medical Officer of the Scottish

Department of Health, preventive medicine over a much wider area than Scotland has suffered a very serious loss. It is all the more serious because at the time of his death he was only 46 years of age, and was definitely in process of establishing himself as one of the outstanding figures of his decade.

The great bulk of his work had been done in Aberdeen, and it was because it showed so much of initiative, originality and enterprise that when the time came to appoint a successor to Sir Leslie Mackenzie, those responsible wasted no time in looking beyond Kinloch. As the health worker must be, he was very much of an idealist, but in his idealism there was a wide streak of the practical which showed particularly in the scheme that he had formulated and that he saw adopted, to an extent, of amalgamating all the health activities of an area and so getting rid of overlappings liable to lead to friction.

It had been hoped that he would have been able to form part of the delegation of British health officers at the Montreal meeting of the American Public Health Association, but greatly to his regret he had to refuse the invitation. This was very unfortunate, since though he was not counted an attractive speaker, he had a great sincerity and chose always subjects that were original, interesting, and stimulating.

London                      CHARLES PORTER, M.D.

# PUBLIC HEALTH ADMINISTRATION

## FIVE YEARS AT BELLEVUE-YORKVILLE

### AN EXPERIMENT IN HEALTH CENTER ADMINISTRATION

SAVEL ZIMAND

*Administrative Director, Bellevue-Yorkville Health Demonstration,  
New York, N. Y.*

THE Bellevue-Yorkville Health Demonstration, under the leadership of Shirley W. Wynne, Health Commissioner of New York City, completed 5 full years of active operation at the close of 1931.\* During this 5-year period under the leadership of the Department of Health and in coöperation with various official and private agencies, the Demonstration, financed by the Milbank Memorial Fund, has combined an experiment in metropolitan health administrative practices with service for the people of the district at the Bellevue-Yorkville Health Center, and the experience there has been an important factor in the formation of plans to erect other health centers, until every district in the city shall have its center. In addition, many specific services, experimentally inaugurated by the Department of Health with the aid of the Demonstration, have since been installed elsewhere in New York, while others are incorporated in the health program of the city.

Thus certain preventive and diagnostic medical services now regarded as indispensable in the maintenance of a

standard of community health had their preliminary trial in Bellevue-Yorkville in the course of these 5 years. The department's first clinic for preschool children was opened at the Health Center in 1927; since that time two have been established in other districts, and last year two others were opened in the Demonstration area. The school children's clinic and the city-wide diagnostic cardiac clinic for children applying for permits to work (the latter with the assistance of the New York Tuberculosis and Health Association), both at the Health Center, are the first of their kind to be carried on under the auspices of the department. The electrocardiogram for the cardiac clinic was purchased by the Demonstration. The department's first complete mental hygiene unit was established in November, 1930, at the center.

The first Department of Health consultation chest service for private physicians was set up in 1929 at the Health Center; the department now operates five others in various districts of the city. X-ray equipment for chest examination was installed here by the Demonstration and subsequently has been incorporated by the Department of Health in its tuberculosis clinics elsewhere in the city. A pneumothorax refill service, established experimentally at the Health Center in 1931, is the

\* Since its inception, Dr. Wynne has participated actively in the work of the Demonstration, and its most important and successful projects have been started at his initiative and suggestion. Dr. Wynne is now, and has been for the past 3½ years, chairman of the governing boards of the Demonstration, and before that time was its vice-chairman.

first department service of its kind. The extension of this service to other parts of the city is contemplated. The services of a tuberculosis consultant, and of a nose and throat specialist, as well as other medical and clerical staff and equipment, were added by the Demonstration to the clinical services of the department.

Another important contribution of the Demonstration is the assistance given to the department's nursing service. Additional field nurses for the district and clerical help for the nursing service were supplied by the Demonstration in order to provide a more adequate staff, and these gradually have been replaced by the department's Bureau of Nursing. In 1928, 10 additional department field nurses were on the Demonstration's payroll; in 1929 there were 5; in 1930, 3 or 4; and by April, 1931, all had been replaced by the department.

Consultants have been retained from time to time to give advice and assistance in their specialties to the nurses and in the clinics. In addition to those serving in 1931 in the fields of mental hygiene, nutrition, and social service, a recreation consultant, from 1927 to the spring of 1930, assisted in developing play facilities in the district and stimulated interest in outdoor activities among adults as well as children.

Important assistance was given by the Demonstration to the Department of Health in the development of its Bureau of Nursing. Early in 1928, when this was created as a separate bureau, the assistant executive officer of the Demonstration became director of the bureau. The Demonstration later provided, for a limited time, 4 special supervisors. Two of these helped prepare a manual and an educational program for the nurses, a third helped reorganize the system of records, and the fourth was assigned to an experiment in the Bellevue-Yorkville District.

This was the introduction of the generalized system, first applied to nurses of the Yorkville unit in 1929, and then to the Bellevue group, which the Bureau of Nursing now plans to extend to other districts.

An interesting and largely successful experiment in health education in the schools was carried on in coöperation with the Board of Education and the Catholic School Board from 1927 to 1930. One consultant was named for the public schools of the area, another for the parochial schools, and a third served 1 year in a junior high school. Their purpose was to help develop a more complete health education program, and much that was introduced during that period became integral to the program, not only of schools in Bellevue-Yorkville, but of those in the city as a whole. Reports describing these projects are soon to be published.

Health education, applying not exclusively to the school population, but to adults working or living in the district, as well as children, has been directed toward securing desirable changes in public opinion, attitudes, and habits on questions of preventive medicine and public health. Perhaps never before in New York City has such intensive, continuous, and widespread health education work been conducted in a district of 150,000 people. Through picture newspapers, through artistic posters for store windows, schools, and social agencies, through special pamphlets and leaflets, circular letters, motion pictures and open forum meetings, vigorous campaigns were conducted on various aspects of public health—child hygiene in general, vaccination against smallpox, immunization against diphtheria, early discovery of tuberculosis and other preventable diseases, correction of dental and other physical defects. One of the first intensive periodic health examination campaigns in New York City was carried on in the Bellevue-Yorkville

District by the Demonstration in co-operation with the medical profession. Two large-scale campaigns conducted on a demonstration basis dealt with venereal diseases and safety. They overstretched local boundaries in interest, having been the subject of wide newspaper and magazine comment.

The health education work of the Demonstration has had the threefold effect of arousing interest in measures to conserve health, of inducing persons to use the services of private physicians or clinics, and of interesting health and welfare agencies of the district, and in some cases outside its boundaries, to do similar work.

Although this brief summary does not aim to measure statistically the results of the activities carried on by the Demonstration, nevertheless some statistical indications may be recorded. However, it is important to recall that the health work in Bellevue-Yorkville has been carried on in coöperation with a number of official and unofficial agencies, and all of these have had an important part in whatever gains the statistics may show.

A concrete result of the continuous emphasis in the health education program on the need for toxoid inoculation is illustrated by a reduction in the death and case rate of diphtheria. The diphtheria death rate for the district averaged 14.2 per 100,000 during the 5-year period 1922-1926 prior to the opening of the Demonstration, and it was reduced to 8.2 for the 5-year period 1927-1931. The case rate was reduced from 197.3 to 169.5. Even allowing for the cyclical changes of the disease, the case and death rate of diphtheria is below what might be expected. It is striking to note that from August, 1929, to March, 1931, there was not a single death from diphtheria in the district.

Another important contribution to the future health of the city is the ad-

vance in child hygiene made in the district in the past 5 years. Through the efforts of a competent and informed nursing service, and as a result of systematic health education, a considerable proportion of the infant population is under observation either by private physicians or in the baby health stations. Approximately 50 per cent of the babies born in the area during 1931 were registered in the three baby health stations. Consultation of private physicians was, of course, persistently urged in every connection.

The infant mortality rate in Bellevue-Yorkville averaged 93 per 1,000 births during the 5-year period prior to the opening of the Demonstration, and was reduced to 86 in the period 1927-1931. The last 3 years have shown a marked decrease, and the rate for 1929-1931 was only 79. The tuberculosis death rate in Bellevue-Yorkville was reduced from 148 per 100,000 during the period 1922-1926 to 116 in the period 1927-1931; while the rate in Manhattan was reduced from an average of 130 in the years 1922-1926 to 123 in the years 1927-1931, and in New York City as a whole from 94 to 74.

During the same period (1922-1926 and 1927-1931) improvements also took place in Bellevue-Yorkville in the death rates of typhoid fever (from 4 to 1 per 100,000), measles (from 17 to 2), scarlet fever (from 3 to 1), whooping cough (from 7 to 3), diarrhea and enteritis (from 40 to 26), and pneumonia (from 212 to 210). The only death rates in this period which show an increase in Bellevue-Yorkville are those of the so-called degenerative diseases (cancer, cerebral hemorrhage and diseases of arteries, and heart disease) and from accidental causes.

But it should be pointed out that the population of the district is so fluctuating not only in numbers, but in its very character, and the influences affecting the death rate and the prevalence of

disease are so powerful and far-reaching, that without far more detailed information than we have at present, and more careful study, it would be impossible to test the usefulness of the work by means of statistics alone.

Two research studies of major importance have been made by the Demonstration. The first was a comparative and clinical investigation of vulvovaginitis, undertaken to provide a basis for advising a practical method of diagnosing gonorrheal vaginitis and to determine the relative efficacy of the several methods of treatment. It was done with the assistance of the Willard Parker Hospital. Begun in 1927, and concluded in 1930, this study is summarized in a report soon to be published, giving a description of clinical procedure and an account of bacteriological work. The report includes the social facts as well as the medical histories of the 322 patients from all parts of the city who were observed.

A study of tuberculosis in 1,000 school children of 13 and 14 years was carried on in 1930. This, it is felt, added to the available information regarding diagnosis and prevalence of this disease in the age group studied and served as a trial of methods which might prove practical in other parts of the city.

The dental service at the center maintained, since 1927, jointly by the Tuberculosis Committee of the Association for Improving the Condition of the Poor, and the Demonstration, has carried on both a clinical and an educational program. The efforts of the service were combined with those of the schools, dental societies, and other community agencies. The educational part of this work cannot be measured statistically, but the following figures give some indication of what has been accomplished in the clinic. In the 5 years from its establishment in 1927 to the end of 1931, the number of pa-

tients treated (nearly all school children) was 11,502. The total number of operations performed was 68,108, an average of 5.9 per patient.

Of recognized value too is the quarterly and yearly compilation, prepared by the Demonstration's division of records, of vital statistics for the 25 sanitary areas comprising its district. A record of the prevalence of diseases, so localized, has made possible greater efficiency in the direction of preventive activities by the Health Center. The Committee on Neighborhood Health Development of the Department of Health, in preparing data for city-wide activities, has been guided to a great extent by the practical experience in Bellevue-Yorkville.

After due trial, certain experiments were discontinued as impracticable on a city-wide scale, or for various specific reasons. An evening Department of Health venereal disease clinic, established in 1927 and closed in 1929, gave 1,703 treatments to 384 patients. The expenditure for the equipment and social service was provided by the Demonstration. Intended primarily as a diagnostic service for physicians, this was, as a matter of fact, sought less for that purpose than for treatment. During 1928 and part of the following year, the Demonstration provided clerical and social service assistance to three venereal disease clinics in the Bellevue-Yorkville District. This was apparently a real help in improving their records and routine and in demonstrating to those directly responsible the need for additional facilities and staff.

For a trial period of 6 months in 1930, office nurses were provided free of charge to give part-time service to private physicians. After the experimental period, those who wished to continue were to pay for the service. To facilitate the private practice of preventive medicine, an arrangement was made in the same year whereby the Demon-

stration met the expense of laboratory tests, such as were not already provided free by the Department of Health, needed by patients unable to pay the usual fees. While both of these trial services awakened real interest, this was not thought to be wide enough to warrant continuing them. A graduate course in the technic of making general health examinations was given for physicians of the district for several terms in 1928 and 1929, but it was not continued thereafter, for it proved to be an expensive method of providing a limited amount of instruction.

Throughout this period, the Bellevue-Yorkville Health Demonstration has been most fortunate in the coöperation it has enjoyed from official and unofficial agencies, especially the Departments of Health, Education, and Police, the Catholic School Board, the churches, voluntary health and welfare organizations, dentists and dental societies, and the medical profession. In all its major efforts this coöperation has been a very important factor. Private physicians in the district have worked with the Health Center in many important projects, and physicians elsewhere in the city have given valued support. Since the opening of the Demonstration, the president of the County Medical Society has served on the Community Health Council.

While new aims have developed in the course of 5 years, the original aims have in the main controlled the program of the Health Demonstration. Known facts about the prevention of disease have been applied to a given area, with the implication that a test of the success of the health program is that it must be applicable to the city as a whole and to other urban areas. At the same time, some services of the Demonstration have overstepped the boundaries of the area, and new city-wide services have been added.

The number of new patients regis-

tered, and the total number of visits these patients made to the various clinics in the past 5 years, indicate roughly the extent and range of medical services performed. It is important to consider the total attendance, since most patients made repeated visits for reëxamination, or immunization, or for advice and consultation. Since 1927, the three baby health stations now functioning, and a fourth which operated only during 1927 and 1928, have enrolled 4,670 new patients, and had a total attendance of 94,507; the preschool clinic established the end of 1927 and the two added in the summer of 1931 enrolled 1,687 children, and had a total attendance of 10,235; and the school children's clinic, since its organization in 1928, has had 1,273 boys and girls upon its register with a total attendance of 2,984.

In the tuberculosis service, the Yorkville district chest clinic for adults and children has examined 4,614 new patients in 5 years, and had a total attendance of 13,634, a large percentage of which were reëxaminations, while the consultation chest service for private physicians has examined 3,294 new patients in the 3 years of its existence, with a total attendance of 4,807. It should be added that every effort has been made to bring in the tuberculosis contact cases, and as a result 78 per cent of the contacts were examined in the years 1930 and 1931.

The consultation chest service for private physicians is designed for those who can afford to pay the fee of their physician but who are unable to meet the cost of X-ray diagnosis and a specialist's examination. Complete findings and an opinion on the case are forwarded to the patient's physician, and no information or advice is given directly to the patient. At the Yorkville district chest clinic, the patient applies directly for diagnosis, advice, and placement. The attending medical service of the clinic has been so reor-

ganized that the patient can always have the same physician and be looked after by the same nurse. It is felt that this method has strengthened the contact between patient and doctor. The children's service of the Yorkville district chest clinic was reorganized in October, 1930, and has proved an important source of discovering new cases needing attention.

Well babies are admitted for examination, immunization, and advice to one or another of the Department of Health baby stations located in the district. At the preschool clinics the same procedure is followed. Correction of physical defects before children are old enough to enter school is encouraged, and arrangements for attending to this may be made with special clinics. Children of school age who require more complete or more detailed physical examination than can be given by school examiners are admitted for diagnosis and observation to the children's clinic, located at the Health Center, especially designed for this purpose. Thus the work of the Department of Health doctors in the schools is supplemented, and the clinic also serves as a clearing house for referring certain children to the special clinics.

At the cardiac diagnostic clinic, which was started as a result of the work of the Cardiac Committee of the New York Tuberculosis and Health Association, a thorough examination is given to every child suspected of having a cardiac condition, among those applying for working papers. The cardiac study includes an electro-cardiogram, teleo-roentgenogram, urinalysis, and complete physical examination. As a result of the work of this clinic, some children were prevented from taking up work which would have been harmful to

their health, while others were relieved of the fear of cardiac conditions and sent back to normal occupations. The objectives of the mental hygiene unit are to carry out among the Bellevue-Yorkville Department of Health nurses an educational mental hygiene program, and to be of service to patients referred by them or by doctors in the various clinics of the department. An important contribution of this service is the progress that has been obtained in working with and through the Department of Health nurses and the medical members of the various clinics.

Such in the main have been the activities of the Demonstration during the past 5 years.\* Some of the achievements can be measured in black and white figures. But there are other more intangible aspirations to which it clings. Who, for example, is able to measure statistically the value of an opportunity for health, with its resultant opportunity for happiness? In seeking to bring this health opportunity within the reach of the less fortunate in the broad and varied territory of the Bellevue-Yorkville District, the Demonstration opens ever widening vistas. Nor are the effects of these activities confined entirely to the district. As pointed out above, some of the work has borne fruit throughout the city, and the ultimate influence of these efforts may be far greater than we at present can conceive.

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\* The years 1922, 1923, and 1924, the so-called prenatal period of the Demonstration, were given over largely to studies on which the choice of a location and the general plan of organization were based. The years 1925 and 1926, the organization years, were spent largely in making further statistical studies of conditions in the district, planning programs, remodeling and furnishing the Health Center, which was opened on August 31, 1926, etc. The population of the district, which extends from 14th to 64th Street on the east side of Manhattan, with Fourth Avenue as the western boundary below 42d Street and Sixth Avenue above, was reduced from 175,000 in 1925 to about 146,000 in 1931.

Madison, Wis.—This city with a population of 57,899 in 1930 operated on a health department budget of \$34,598, exclusive of hospitalization. A general death rate of 8.8, a birth rate of 19.3, and an infant mortality rate of 44.8 are noted. Of 41 cases of diphtheria reported, only 2 were considered as chargeable to the city, as 28 were non-residents and 11 occurred among nurses and employees of the hospital in which the majority of non-resident cases were treated. No diphtheria occurred among nurses or employees of the quarantine hospital. There were 8 cases of typhoid fever, 5 in one family, all non-residents, who were brought to the hospital for treatment.

The Board of Health maintains an eye, ear, nose, and throat clinic, to examine, advise, and correct defects among school children. The children who are sent to the clinic have had a preliminary vision test by their teacher and a public health nurse. If a child is found to have defects, a notice is sent to the parent with advice regarding correction. The indigent cases are returned to the clinic for complete examination and treatment. Glasses are furnished if necessary, and operations for removal of tonsils and adenoids are performed at the hospital at the expense of the Board of Health.—*Annual Report*, Madison Board of Health, 1930.

**Vital Statistics for Montreal, Canada, 1930**—The annual report of the Montreal Department of Health for 1930 maintains the standard of excellence set by the department in its annual reports, which present a clear

statement of health conditions in Montreal and the activities of the department.

It is interesting to note that the estimates of population made by the department are confirmed by this year's census figures. The birth-rate of 26 is below the average, which was 31 for the past 10 years. The same is true of marriages, which were 8.4 per 1,000, as compared with an average of 9.4 for the preceding 10 years.

The general death rate of 12.9 per 1,000, shown in this report, is the lowest rate experienced by Montreal. It represents a decided gain over the rate of 15.2, the average of the past 10 years. An infant mortality rate of 124 is high, but it is low as compared with the records of past years. Diarrhea and enteritis are responsible for one-third of these deaths, and this indicates the need for more instruction in infant care. The mortality from tuberculosis continues to decline from a ten-year average of 143 deaths per 100,000 to 124 in 1930.

The rates vary considerably for the different races making up the population of Montreal. The French-Canadian birth rate is 31.9, and their infant mortality rate, 136. The British-Canadian rates are 17.8 and 78 respectively.

Deaths from cancer and organic disease of the heart are increasing; deaths from pneumonia and broncho-pneumonia are decreasing. The cancer rate for the first time went over 100, being 102; the average for the past 10 years was 84.—*Canad. M. A. J.*, 25: 755 (Dec.), 1931.



# LABORATORY

## THE ISOLATION OF AN ORGANISM OF THE ABORTUS-MELITENSIS GROUP FROM A BLOOD CLOT, THE SERUM OF WHICH FAILED TO GIVE AGGLUTINATION WITH *B. ABORTUS*\*

RUTH GILBERT, M. D., F. A. P. H. A., AND H. GLADYS DACEY

*Division of Laboratories and Research, New York State Department of Health,  
Branch Laboratory, New York, N. Y.*

AN organism of the abortus-melitensis group was isolated from a specimen of clotted blood submitted to the laboratory 3 weeks after the onset of illness. No agglutination of *B. abortus* was obtained either in this specimen or in one examined 2 weeks later. No agglutination of *B. typhosus*, *B. paratyphosus* A, or *B. paratyphosus* B was obtained. The clot was cultured in a bottle of liver-infusion broth which was stoppered with a rubber stopper and incubated at 37° C. for 1 week.

Subcultures were made on liver-infusion agar at the end of this time and incubated in a closed jar in which approximately 10 per cent of the air had been replaced by carbon dioxide.

After 1 week's incubation, colonies of organisms belonging to the

abortus-melitensis group had developed.

Suspensions of the growth were agglutinated in a 1:2,500 dilution of immune serum prepared with *B. abortus*. The organisms were not agglutinated in the patient's serum.

The patient, a housewife of 45 years, became ill on April 1, 1930, with a pain in the chest, headache, vomiting, shortness of breath and fever varying from 100° to 103°. Remissions of temperature occurred every day at noon and lasted for 4 hours. In April, 1928 (two years before), the patient had been ill for 18 weeks with exactly the same symptoms.

There was no history of contact with goats, cows, or swine, but the patient had consumed raw cow's milk from a herd in which abortions had occurred.

\* *J. Lab. & Clin. Med.*, Jan., 17: 345-346, 1932.

## A MODIFICATION OF THE FILDES ANAEROBIC JAR

G. D. CUMMINGS

*Bureau of Laboratories, Michigan Department of Health, Lansing, Mich.*

MCINTOSH and Fildes<sup>1</sup> published specifications and directions in 1916 for the operation of an anaerobic jar utilizing the palladium capsule for combining hydrogen and oxygen. Fildes<sup>2</sup> further improved the method in 1921. In the same year Brown<sup>3</sup> pub-

lished further modifications of the Fildes jar.

All three papers specified the use of a glass museum jar covered by a metal top. The modification here presented is the same in all fundamentals as in the methods of Brown and Fildes with

three exceptions—the construction of the jar, the resistance unit, and the gasket seat. For early experiments the writer used the method as advised by Fildes, that is, glass jar, metal top with platinum coil suspended below, and light bulb resistance. During the 21st run, the apparatus exploded and was completely demolished. This experience was sufficient to cause the writer to have a metal jar constructed to take the place of the glass one.

The specifications are as follows:

1. Jar (See Figure I)—The jar was constructed from a piece of brass pipe 6" outside diameter x  $9\frac{3}{8}$ " long x  $\frac{3}{16}$ " thick. A brass bottom was soldered on and sealed both inside and out. A brass collar holding three eyebolts with wing nuts and washers was slipped on over the top of the jar and screwed into place. The collar was sealed with solder to insure an air tight fit.

2. Cover (See Figure II)—The cover was cast in brass in one piece and notched at points to correspond to the wing nuts attached to the collar of the jar. Four holes were drilled through the top, two for binding posts and two for the inlet and outlet valves. These joints were made tight by painting all screw threads with a combination of graphite and shellac. A copper tube was attached to the under side of the inlet valve leading to the bottom of the jar. The under side of the cover was reamed out to fit a rubber gasket,  $5\frac{7}{8}$ " inside diameter x  $\frac{1}{2}$ " wide, thus cutting down the possibility of gasket spreading and subsequent passage of air into the jar. This point is important, as a flattening of the gasket and air suction into the jar apparently caused the above mentioned explosion. The palladium coil, surrounded by fine mesh brass wire, was suspended from the under side of the cover by two hooks screwed into the cover. The portions of the coil, hooks, and inlet pipe, shown in white in the above figures, were covered with adhesive tape to prevent contact of the coil wire with the metal of the jar.

3. Palladium coil (See Figure II)—The coil was constructed as in the Fildes specifications. 0.25 gm. of asbestos wool were soaked in 1.5 c.c. 10 per cent palladium chloride and the asbestos molded into a small square in an evaporating dish. The mass was gently heated until almost dry and then wrapped around a  $\frac{1}{4}$ " glass rod with lens paper. A No. 8 rubber stopper (large end out) was

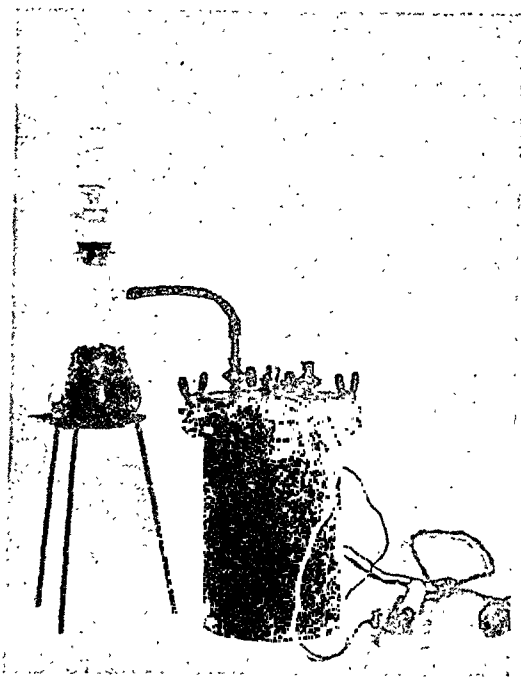


FIGURE I

placed on either end of the rod and a 20 G needle was passed through each. The needles were cut at both ends, thus allowing easy passage for the resistance wire; 2.41 ft. (50 ohms) of 35 G B & S nichrome wire were tightly wound around the asbestos, and the ends passed through the needles in the rubber stoppers. The wire was wound on tightly enough to allow sufficient length on the outside of each stopper for attachment to the under side of the respective binding posts. The coil was heated in a smoky flame, ignited, and finally wrapped in the brass-mesh wire and taped into place. (At this point the coil should ignite a stream of hydrogen.) The coil was suspended on the hooks and the ends of the resistance wire attached to the binding posts.

4. Resistance (See Figure II)—For resistance 2.89 ft. (60 ohms) of 35 G B & S nichrome wire were used instead of light bulbs on a 110 volt circuit. The porcelain coil

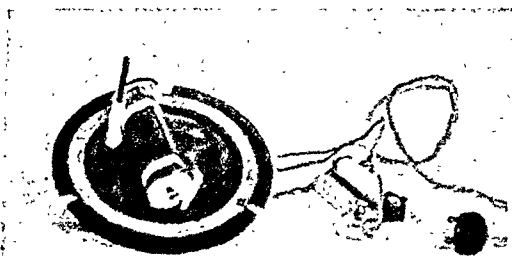


FIGURE II

shown could be much smaller but was the only one available at the time.

5. Hydrogen source (See Figure I)—Technical grade zinc and technical hydrochloric acid were used as the hydrogen source. This source was used deliberately rather than tank hydrogen to assure drop by drop control.

6. Operation—Clamp on top and attach hydrogen generator (See Figure I)—With both valves open, allow a slow but steady stream of hydrogen to pass into the jar for 2 minutes. Shut off hydrogen supply, close both valves, and plug jar and resistance into light circuit for 20 to 30 minutes. During this time the top should heat up so that the change in temperature becomes easily detectable. During the whole operation the connection between the hydrogen generator and the jar should not be broken. Open inlet valve and the vacuum created in jar will be indicated by suction on the acid in the tip of the separatory funnel. Run hydrogen slowly into jar until it will take no more. With the inlet valve open repeat this procedure at intervals of 2 to 3 minutes until the jar will finally take no more hydrogen (total time less than 10 minutes). Close off inlet valve, disconnect resistance and hydrogen generators and incubate the jar.

This jar incorporates the following changes from the Fildes and Brown methods: (a) All metal jar; (b) stand-

ard resistance supplied by nichrome wire; and (c) inset gasket in metal cover. The metal jar eliminates the possibility of explosion and allows the use of a well heated palladium coil, the securely seated gasket eliminates air leakage, and the nichrome wire throughout allows a constant number of ohms resistance in the palladium coil and in the resistance unit. The main disadvantage is that the operator is unable to see what growth takes place or to observe whether the methylene blue control tube stays colorless. After several runs, however, the operator is able to predict the efficiency of the jar by the amount of acid taken up in the formation of hydrogen, and to predict the action of the methylene blue tube.

To date the writer has isolated 14 strains of *Cl. tetani* from soils and manure using the Fildes technic and has cultivated stock strains of the organism with extreme ease.

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# VITAL STATISTICS

**Vital Statistics in Indiana, 1931—**  
The Vital Statistics Division of the Indiana State Board of Health has published a tentative report for the calendar year 1931. According to this report, the state enjoyed last year the lowest general mortality in its history. The death rate from all causes was 11.9 per 1,000 population, as compared with 12.1 in 1930. The birth rate in 1931 was 17.2 as contrasted with a rate of 18.3 in 1930 and 21.6 in 1922.

It is interesting to note that the death rates from tuberculosis (61.1), typhoid fever (2.9), infant diarrhea (13.9), puerperal septicemia (2.6), and from all puerperal causes (9.6) are the lowest from these causes that have ever been recorded in Indiana. Contrasting these rates with the figures shown for 1922, it is noticeable that a great improvement has taken place. Tuberculosis showed a death rate of 88.1 in 1922, the 10-year period 1922-1931 indicating that a reduction of 31 per cent in the death rate from this disease has been effected. In the same period, the typhoid fever death rate has been reduced 63 per cent, infant diarrhea 43 per cent, puerperal septicemia 55 per cent, and all puerperal causes 28 per cent. Diphtheria which showed no reduction in mortality from 1930 to 1931, has, however, dropped from 18.2 in 1922 to 4.1 in 1930 and 1931, a reduction of 77 per cent. Similarly, the infant death rate was not lowered in 1931, the 1930 rate of 57.4 holding in 1931 also. This rate compared with the 1922 rate of 68.1 means a considerable saving of infant lives during the last decade.

There was a noticeable increase in the death rate from cancer (106.1 as compared with 104.6 in 1930 and 94.5

in 1922). This increase in death rate amounts to a 12 per cent increase during the last decade. Deaths from external causes increased from 3,522 in 1930 to 3,660 in 1931, giving death rates of 108.7 and 112.7 for the years 1930 and 1931 respectively. In spite of these increases in cancer and accidental deaths, it is encouraging to note a substantial reduction in the death rate from organic heart disease, from 190.0 in 1930 to 176.8 in 1931, even though this 1931 figure does not compare favorably with the death rate of 156.8 recorded in 1922.

Beside the above mentioned changes in mortality from 1930 to 1931, the report for Indiana showed increases in the mortality from scarlet fever, measles, whooping cough, influenza, suicide, and automobile accidents; while decreases were observed in the mortality from pneumonia, acute poliomyelitis, cerebrospinal meningitis, homicide, smallpox, apoplexy, and Bright's disease.—*Month. Bull.*, Indiana State Board of Health, 35: 2-3 (Jan.), 1932.

**Health in New York City, 1931—**  
The New York City commissioner of health, in his annual report submitted December 31, 1931, records the lowest infant death rate (56 per 1,000 births) and the fewest deaths from diphtheria (185) in the history of New York City. Despite the severe economic depression and unusual outbreaks of influenza and poliomyelitis, the general death rate of 10.92 compared favorably with that of 10.76 in 1930 and 11.34 in 1929. The total number of deaths in 1931 was 77,418. There were 954 deaths from influenza in 1931, as compared with 483 in 1930; the outbreak resulted in

about 2,000 deaths above the normal expectancy, however, when deaths registered under pneumonia and other causes, in which influenza played a part, were considered. During the poliomyelitis outbreak, 4,087 cases were reported to the department and there were 490 deaths. In the outbreak of 1916 there were 9,023 cases, with 2,448 deaths.

The year was also marked by a high prevalence of measles, 26,516 cases having been reported; whereas in 1929 there were only 2,500 cases. Deaths from automobile accidents were more numerous than deaths from typhoid fever, measles, scarlet fever, diphtheria, whooping cough, cerebrospinal meningitis, and deaths of mothers in childbirth, combined. There were 1,302 deaths in 1931, an increase of 26 over 1930. Deaths from diabetes amounted to 1,921 as against 1,784 in 1930. Cancer increased from 8,125 in 1930 to 8,333 in 1931. The city's birth rate was 16.31, the lowest ever recorded.—*J. A. M. A.*, 98: 239 (Jan. 16), 1932.

**The Geography of Homicide—**Geography is an important factor in homicide. Race likewise has a big influence over the murder rate. Density of population and the existence of large cities in the territory seem to have very little to do with homicide. These conclusions appear to be justifiable on the basis of statistics compiled by Dr. R. N. Whitfield, State Registrar of vital statistics in Mississippi, who collected data from all but 6 states in the United States and from Canada for the 3 years of 1928, 1929, and 1930.

According to the figures for 1930, New Hampshire had the lowest recorded murder rate, as shown in the Whitfield data, among the 42 reporting states. Only 4 homicides were registered and the rate per 100,000 population was 0.8. The 5 New England states of Maine, New Hampshire, Vermont, Massachusetts, and Rhode Island, with an aver-

age of 132 people per square mile and numerous large cities, had an aggregate average rate of only 1.4 which is by all odds the lowest recorded for the various geographical groups of states.

The highest average for a geographical group of states was 20.9 homicides per 100,000 population, the rate for the East South Central states of Kentucky, Tennessee, Alabama, and Mississippi, where there are only 55 inhabitants per square mile.

The densely populated Middle Atlantic states of New York, New Jersey, and Pennsylvania, with 263 people per square mile, had an average rate of 5.2 compared with 7.3 in the East North Central group with an average of 103 people per square mile and among which Illinois led with 10.5 murders per 100,000 people.

The three Pacific states, with only 26 inhabitants per square mile, had an average rate of 5.2, a figure identical with that for the three Middle Atlantic states and somewhat higher than the figure for the West North Central group, where the density is 26 people per square mile and which had a murder rate of 3.6 per 100,000 population.

While in general the states with a large Negro element in the population experience excessively high homicide rates this does not appear to be the only important determining factor. The New England and the Pacific states, for example, have each almost exactly 1 per cent Negro population and yet the homicide rate in the former was 1.4 against 5.2 in the latter.

Again the homicide rate in North Carolina and in Illinois was almost identical, 10.9 and 10.5, respectively, although Negroes make up 29 per cent of the population in North Carolina and only 4.3 per cent in Illinois. Also in South Carolina the Negro population is 46 per cent of the total against 8.6 per cent in Kentucky, but the murder rate in South Carolina was only 13.9 per

100,000 population, whereas in Kentucky it was 18.6. Mississippi, on the other hand, where 50 per cent of the population is Negro, had a murder rate of 25.7, the highest in the country, but Tennessee had a homicide rate of 18.9, although Negroes make up only 18 per cent of the population. Again, New Jersey has 5.2 per cent Negroes in the population against 4.3 per cent in Illinois, but the murder rate in New Jersey was 5.0 and that in Illinois 10.5. Furthermore, the density of population in New Jersey is 420 per square mile and that in Illinois 116.

This is clear evidence that factors other than race, color, and density of population are involved in the homicide rate. While these statistics relate to the 1930 experience only, there was no great difference in the relative rates in the various states during the 3 years 1928-1930.—*Illinois Health Messenger*, 4: 15-16 (Feb. 15), 1932.

**The Population of the Netherlands**—The population of the Netherlands has increased rapidly during the past 100 years. From 1829 to 1928 it rose from 2,613,487 to 7,730,577, an increase of 195.86 per cent. This increase in population has been especially rapid during recent years as is illustrated by the fact that during the 70-year period from 1829 to 1898 it increased 100 per cent, while from 1899 to 1928 it increased 66 per cent. Since 1920 the increase has been at the rate of approximately 100,000 per year. This increase resulted in 1928 in a population density of 585.1 per square mile, placing the Netherlands second to Belgium among the European nations in this respect.

As emigration has exceeded immigration, the recent increase in population must have been due to an increasing birth rate or a decreasing death rate, or both. The birth rate in the Netherlands rose until approximately 1875, and has declined steadily since that time.

The fairly rapid decline within recent years is doubtless due in part to the great emphasis placed on birth control. On the other hand, the death rate per 1,000 has declined for the past 100 years, but the decline has been especially rapid since 1875.

The figures indicate that the increase in population was chiefly due to an increasing birth rate until the last quarter of the past century, while since that time the declining death rate has played the most important part.

The changes in birth and death rates have not been uniform in all sections of the country. Both have decreased least in the southern provinces. These are the sandy soil areas which developed later than the central clay districts. In North-Brabant, for example, the birth rate per 1,000 was 28.98 in 1927; this was considerably above the figure for the country as a whole, which was 23.11 in the same year, and was exactly the same as the average for the same area for the period 1840-1849. It is only fair to say, however, that between these two periods the birth rate in the province had risen to 34.13. In this same area the death rate did not start to decline until 1870, although throughout most of the rest of the country it had been declining for at least 40 years prior to that date. It has been in the older provinces, for the most part, that the decline in both birth and death rates has been greatest. This has been especially true in North and South Holland. The exact reasons for this are difficult to determine.

Historical, social, and economic factors have all played their parts. These centers were the first to develop economically and have experienced the greatest prosperity. They have also been the centers of the intellectual life of the country and here medical science and sanitation reached their highest development. On the sandy areas the economic and intellectual awakening was

later in arriving. These factors, at least in part, account for variations in the birth and death rates in the two sections.

The birth and death rates and the increase of population vary in communities of different sizes. The larger communities have been increasing in relative importance while the smaller ones have been losing ground. In spite of this, the larger cities have a lower natural increase than the smaller towns. In 1927 communities of more than 100,000 had a death rate of 9.17 per 1,000, while communities of less than 5,000 had a rate of 11.35. In the same year communities of over 100,000 had a birth rate of 18.88, while communities of less than 5,000 had a rate of 25.69. As the variation in birth rates is greater than that in death rates, the increase in population from natural sources is more rapid in the smaller communities. The increasing importance of the larger cities must thus be accounted for by the fact that they are attracting large numbers of people from the smaller towns.—J. F. Bogardus, *Economic Geography*, 8: 43–45 (Jan.). 1932.

**Marriages of Girls 14 and 15 Years of Age**—An analysis of the marriage records of the State of New York outside of New York City for 1930 shows that in 230 marriages the bride was under 16 years; 33 brides were 14, and 197 brides 15 years of age. The distribution of the ages of the grooms

whom these girls married, was as follows: under 20 years, 46; 20–24, 132; 25–29, 32; 30–34, 13; 35 years and over, 7. The youngest groom was 16, the oldest 51 years of age. The median age of the grooms of the 14 year old brides was 22.8 years; of the 15 year old brides, 21.3; and for the combined ages, 21.5 years.

The assertion is often made that child marriages are largely confined to that section of the population which is of foreign birth or of immediate foreign origin. The figures, however, do not support this statement. Of the 230 brides, 10 were foreign born; 5 natives of Italy and 5 of Canada. Of the 220 native born brides, 153 were of native parentage, 12 of mixed parentage, and 55 of foreign parentage. Relating these numbers to all marriages in the several nativity groups, it is found that these child marriages represented 6 in 1,000 of the native born brides of native parentage, the same proportion in the group of native born brides of foreign parentage, while among native born brides of mixed parentage only 2 in 1,000 were 14 or 15 years old.

Among the grooms, 47 were foreign born: 23 were natives of Italy; and 6, of Canada; the remaining ones were natives of twelve different countries. The native born grooms were divided according to parentage as follows: native, 129; mixed, 23; foreign, 31.—*Health News*, New York State Dept. of Health, 8: 230 (Dec. 21), 1931.

# PUBLIC HEALTH ENGINEERING

## THE SANITARY OFFICER IN RURAL SANITATION\*

H. W. VAN HOVENBERG

*Sanitary Engineer, St. Louis Southwestern Railway Lines, Texarkana, Tex.*

PERSONAL contact with and observations of the working of county health units and of rural sanitation projects in those counties in states served by the St. Louis Southwestern Railway and other railroads with which I have been associated, suggest these personal views on the present plan of operation of county health units. Nothing I may say should be construed as a criticism of the present plan, or of those with whom it has been my pleasure to be associated, but rather as thoughts for discussion, based on the desire of some of the personnel engaged in rural public health work to make it more effective.

Much has been written of the multiple necessities for county health units, of progress being made, and of what the future holds for their personnel. If we discount the enthusiasm of many of these writers we still have a considerable sum total of accomplishment. This same enthusiasm may have occasionally overreached itself in assigning dollar and cents values to achievements, particularly from the sanitary engineering viewpoint. I refer to the comparative values of privy installations versus sewerage systems and safe water supplies, and to widespread typhoid vaccination with no attention being paid to providing safe water and milk, or to proper screening. Immunization has its

proper place, but surely not to the exclusion of basic sanitary health protective measures.

I think it is entirely proper and feasible to include the sanitary portion of rural health work in our southern states within the province of those basically trained in sanitary engineering or those having had instruction fitting them for inspection and disposition of sanitary problems. I refer particularly to rural water supplies, fly and mosquito control, screening, milk production, insect and rodent eradication about the house, and human waste disposal. These, with some others, might be grouped under the heading of environmental sanitation problems. We readily realize that such activities are basic since proper control measures are aimed wholly toward prevention of disease, and, while directed toward the home in most instances, their province and indirect influence extend over the hamlet and city as well. Hookworm, malaria, and dengue, and diseases carried by infected water and milk, can be controlled by proper application of environmental sanitary measures. In my opinion too many of our present health units are missing a wonderful opportunity in not making greater provision for such work.

In seeking the reason for this delinquency, as I may choose to call it, it appears that in our present conception of unit health work, the strictly sanitary functions are being underemphasized. This may be due to a number of reasons, possibly to lack of appreciation of

\* Read before the Public Health Engineering Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 17, 1931.



such phases of public health work; possibly to inability to secure trained sanitary personnel, but more likely to the confusion in the minds of many otherwise capable men who choose not to view public health work from the broad viewpoint of joint coöperation and responsibility of the medical officer, the sanitary engineer, the bacteriologist, the serologist, the veterinarian, etc.

My feeling is that the so-called standard county health unit can be decidedly improved with a relatively small additional cost. I would suggest no change in the present personnel of doctor, sanitary inspector, nurse, and clerk, but rather for better trained sanitary inspectors, better paid sanitary inspectors, and for trained sanitary engineering supervision for such inspectors, rather than medical officer direction of these sanitary inspectors. Such a plan reserves to the medical officers at the head of our units all the authority granted them by law, all the prerogative of planning health work and of policies to be pursued, but relieves them of immediate direction of sanitary work, and passes this responsibility on to district sanitary officers or engineers, who in turn report to the state sanitary engineer. In other words, just as provision is made for supervision of unit medical directors, so should qualified direction be provided for unit sanitary inspectors, and this can be done without changing the routine working of the units.

But first of all, I would dignify the position now held by the sanitary inspector by changing his title to sanitary officer, and he will be so designated in the balance of this paper. Such a plan will not be an entirely new departure, but I think its merits are obvious. It provides for complete coördination of public health medical and sanitary policies through the present medical director of county health units and the state sanitary engineer, or engineering bureau director, which is of vital impor-

tance and is the logical first step in any state-wide health program.

After a definite plan of county health unit activity is decided on, then the sanitary engineering functions, delegated to the state sanitary engineer, will be put into effect by district sanitary engineers, or sanitary officers, who have direct supervision over the county health unit sanitary officers. These district men, with offices in their respective districts, and in charge of sanitary engineering activities in say ten counties, would be the contact men between the unit sanitary officers and the unit medical directors. Local health unit policies would then be handled with promptness. The advice of the district sanitary engineer, a man of professional and practical experience, would be available to the medical director, in the handling of problems with which he is not familiar.

The unit sanitary officer, under district supervision, could share offices, equipment, and stenographic help with the medical director, if advisable, but this would not be necessary. It surely would be advisable to have the medical officer wholly acquainted at all times with the work of the sanitary officer, but difference in personal opinion on the prosecution of coöperative unit health work should be handled by their immediate superiors. A close, harmonious, and self respecting understanding between the medical and sanitary officer could thus be maintained—each an expert in his own profession, and making no pretense toward running the other's business.

There will be reasons for objections to such a proposal. We may be told that a similar plan failed after due trial. Perhaps the failure may have been due to lack of trained sanitary supervision, or to other local handicaps. Surely we can find comparable disappointments in whole time unit activities. In a plea for sanitary engineering supervision of unit sanitary officers, we can speak in

generalities of some of the reasons why this is preferable. Few of our medical directors are qualified by training or have the time to take from the multiplicity of their other non-sanitary activities to direct sanitary engineering work properly. Some of them surely lack the personal inclination for it. Under such conditions, any latent executive ability, when present, cannot very well assert itself, and the inspector becomes an orphan waiting for inspiration that never comes, and is too timid under the penalty of loss of position to be self assertive. In fairness to some of the inspectors who have given up public health work, I think it may be said that they tried and failed, but the fault was not their own.

If there is a basic error in our conception of the present health unit organization, it is that an educated man, skilled in his work, able to contact the lowly and the mighty, and fired with enthusiasm, is not at least a junior partner, with some provision made to reward ability by promotion. Such a condition does not exist at present. Yet we have in our counties the county agricultural agent, a comparable position in my mind with what the sanitary officer should be, and for whom no one need offer apologies. Perhaps the day will come when the county sanitary officer will enjoy the same prestige, the commensurate salary, and the opportunity for increasing health and happiness that the county agent enjoys in his chosen sphere.

Men trained to fill the positions of sanitary officers, as distinct from sanitary inspectors, will be hard to find. I know of no school of instruction for them such as has been available to others engaged in unit work, or as has been available to the layman who with

a few weeks' instruction becomes a full fledged sanitary inspector. Our schools are graduating men in courses in sanitary engineering or allied subjects who can fill the sanitary officer positions, and who can get their first taste of the practical application of their profession under expert leadership with the plan just presented.

The cost of the present standard county health unit would be increased under such a plan, principally by the increased salary of the sanitary officer. I suggest the average salary increase, over what now prevails for the sanitary inspector, should approximate \$900 a year, or less than 10 per cent of the present unit cost. Part of this increase might be taken from the present budget items without material damage. We now have some states with district sanitary engineering directors. In those states not so progressive, the expense of district sanitary engineers or officers would have to be provided. In the territory with which I am more familiar, one district sanitary engineer could readily supervise the work in ten counties, making the average cost per county, if placed on this basis, not over an additional \$540 a year, assuming a \$3,000 salary, \$900 traveling expenses, \$900 stenographic assistance, and a \$600 contingent fund, for the district man.

With or without the district engineering supervision of the county sanitary officers, but presupposing efficient state sanitary engineering direction, such a plan as outlined will be a decided improvement, with perhaps the greatest good coming from the coördination in state- and county-wide planning of rural health work of medical and sanitary engineering science, something in my opinion greatly to be desired.

# FOOD AND NUTRITION

**Proteins of Breads Baked from Rye and Wheat Flours Alone or Combined with Yeast or Soya Bean Flour**—These experiments were conducted in Poland and the biological analysis of 17 products is discussed in the present paper. These are divided into 3 groups: (1) various breads commonly consumed in Poland, (2) experimental breads, (3) soya bean flour and baker's yeast. In the preparation of the breads special interest was shown in combinations of rye and wheat flours with varying amounts of baker's yeast and of soya bean flour. The numerical method proposed by Osborne, Mendel and Ferry (*J. Biol. Chem.*, 37: 223) was used for the estimation of the biological value of the proteins of the products studied.

The experiments were made on rats and were usually of 30 days' duration. The composition of each bread used is given, as well as a table showing the protein intake, total intake, gain in weight, etc., on each kind of bread fed.

While the authors made no definite conclusions, the figures would indicate that rye breads in general are superior—so far as the biological value of the protein goes—to wheat products, and that darker rye breads made from less refined flour are superior to lighter varieties. It is also indicated that whole meal rye bread baked from 100 per cent rye flour is inferior to dark rye bread prepared from 82 per cent flour. This might be due to the presence in whole meal rye bread of large amounts of indigestible roughage derived from the grain husks and interfering with the normal utilization of the proteins.

A supplementary relation was found to exist between the proteins of white

wheat flour and those of baker's yeast, and also between the proteins of white wheat flour and soya bean flour. There is a strong indication that a supplementary relation exists between the proteins of rye flour and of soya bean flour. The biological value of the nitrogen of crust was found to be lower than that of crumb or of whole bread.—S. K. Kon and Z. Markuze, *Biochem. J.*, 25: 1476, 1931.

**Experiments on Nutrition, Comparative Vitamin B<sub>1</sub> Values of Food-Stuffs. Fruits and Vegetables**—Tests on the vitamin B<sub>1</sub> values of 30 common fruits and vegetables were made on pairs of pigeons. The preventive method of testing for the presence of vitamin B<sub>1</sub> was used throughout the series of experiments. Cooked vegetables and fruits were used as the means of procuring consumption. No objection can be made to this procedure since many workers have shown that vitamin B<sub>1</sub> is not destroyed by a temperature of 100°. In the first trials with fruits and vegetables 50 per cent of the fresh food was mixed with the flour and fishmeal. Most of the pigeons showed head retraction in from 3 to 9 weeks. After 9 weeks 70 per cent or 80 per cent was then tested.

In no case were the pigeons maintained when the fruit composed 50 per cent of the diet. With 70 per cent of the diet composed of fruit, maintenance was not longer than 9 to 11 weeks, except in the case of orange juice and orange peel. With 80 per cent of tomatoes the birds were maintained for the test period of 26 weeks or more. The test indicated that orange peel is equal to orange juice in vitamin B<sub>1</sub>, but

the general appearance of the birds leads to doubt. It is suggested that the oil in the rind has some medicinal action.

Pigeons were maintained on a diet with 80 per cent of cabbage, and 80 per cent of watercress. Lettuce and spinach at 80 per cent and 70 per cent failed to secure maintenance for 26 weeks. Brussels sprouts showed very little vitamin B<sub>1</sub>.

Of the roots and tubers tested, artichokes, leeks, parsnips and potatoes contain some vitamin B<sub>1</sub>. Beetroot, carrots, swedes, and turnips contain very little.

The results here do not indicate that vegetables and fruits have any important value as a source of vitamin B<sub>1</sub> in the general human dietary. In order to supply sufficient vitamin B<sub>1</sub>, from 60 per cent to 80 per cent of the diet must be composed of these foodstuffs in the fresh state, amounts impossible for man to consume. The amount of vegetable usually eaten by man is not alone enough for his vitamin B<sub>1</sub> requirement.—Robert Henry Aders Plimmer, William Henry Raymond, and John Lowndes, *Biochem. J.*, 25: 1788, 1931.

**The Antiscorbutic Vitamin in Home-Canned Carrots**—The purpose of this study was to determine the difference, if any, of the effect of pressure-cooker and water-bath processing on vitamin C potency. Carrots were used because they are a good source of vitamin C and because both methods are employed. When the water bath is used it is customary to add a small amount of vinegar or lemon juice to increase the effectiveness of the heating process in killing microorganisms. The carrots were canned in 3 ways: (1) water bath with vinegar, (2) pressure cooker with vinegar, and (3) pressure cooker without vinegar.

Normal guinea pigs, weighing about 350 mg. were fed a basal diet, lacking in

vitamin C, consisting of ground oats, wheat bran, skim-milk powder, butterfat and sodium chloride. To insure vitamin D sufficiency, in some of the later experiments, cod liver oil replaced 2 per cent of the butterfat.

The results indicate that practically all the vitamin C present in raw carrots is destroyed when carrots are cold packed with a small amount of vinegar and heated in a water bath for 90 minutes, or are processed with or without vinegar in a steam-pressure cooker for 40 minutes at 10 lb. pressure. A daily dose of 15 to 20 gm. of raw carrots was required to protect a guinea pig from scurvy, but even when 50 gm. of canned carrots were fed, most of the animals developed severe cases of scurvy and all of them died before the end of the test period. No difference was noted in the carrots processed in the pressure cooker with and without the addition of acid.—Adelaide Spohn and Amy Hunter, *J. Agri. Res.*, 43: 1101 (Dec. 15), 1931.

**The Antiscorbutic Vitamin in the Juice of Home-Canned Tomatoes**—Since carrots are representative of the "nonacid" class of foods, and since they were shown to lose their vitamin C potency when home canned, it was considered of interest to determine the effect of home canning on a food having a natural pH greater than that of carrots. Tomatoes were chosen since they are a typical acid food. Two varieties of tomatoes, Globe and Bonny Best, were used. They were cold packed and processed for 20 minutes. Guinea pigs, weighing an average of 350 gm. were fed a basal diet of skim-milk powder, ground whole oats, wheat bran, butterfat, and sodium chloride. The control group received only the basal diet and distilled water, while the remaining animals received in addition 1 to 4 c.c. of either canned or raw tomato juice.

A considerable loss of vitamin C in the canned product. was indicated. Three and one-half c.c. of the raw tomato juice was sufficient to protect the guinea pigs from scurvy, while 4 c.c. of the juice of the canned tomatoes failed to protect the animals.—Adelaide Spohn, *J. Agri. Res.*, 43: 1109 (Dec. 15), 1931.

**Vitamin G and the Growth Factor in Tomato Juice**—The animals used in this experiment were young rats, approximately 4 weeks old, weighing 30 to 40 gm. each. They were placed in individual screen-bottomed cages and fed the following ration: casein, corn-starch, Osborne and Mendel salt mixture, lard, and 2 drops of cod liver oil per rat daily. After 1 week of depletion on the basal ration devoid of all factors of the B complex, constant weights were obtained. Graded doses of tomato juice were then fed daily in separate cups for an 8 weeks' period. Weights of the animals were recorded daily as well as symptoms of deficiency.

In the groups that lived long enough to develop a dermatitis, it always appeared in approximately 44 days, regardless of the amount of tomato juice fed. That the dermatitis was of nutritional origin, and not of epidemic nature, is indicated by the fact that the rats were kept on the same racks as some rats used in vitamin A assay experiments, and these showed no dermatitis. This shows the absence of vitamin G from the tomato juice.

On the smaller quantities of juice, the rats showed a loss of weight and on the larger doses a gain. It is shown that this gain cannot be correlated with any presence of vitamin G and probably is not related to the presence of vitamin B ( $B_1$ ) since previous experiments (*Biochem. J.*, 24: 1827, 1930, *J. Biol. Chem.*, 89: 275, 1930) have shown the absence of growth when rats were fed an abundance of this vitamin. This growth factor, therefore, probably

is Reader's  $B_4$  or the vitamin F, of which Sure, Smith and Kik speak (*Science*, 73: 242, 1931).—R. G. Daggs and A. G. Eaton, Dept. of Vital Economics, University of Rochester, Abstract, *Science*, 75: 222 (Feb. 19), 1932.

**An Economical Method of Producing Acidophilus Milk**—The method reported by the author is claimed to overcome some of the difficulties encountered in the commercial production of acidophilus milk. It is stated that the problem involved in the manufacture of acidophilus milk is possibly that of eliminating fast growing sporulating organisms.

The method consists in incubating skim milk at 37° to 47° C. for 2½ to 3 hours, heating to as near the boiling point as possible for 30 minutes, quick cooling at 37° to 40° C., prompt inoculation with an active culture of *Lactobacillus acidophilus* and holding at that temperature until coagulation takes place.

The method is certain to give a better product than the one now in use, and has the merit of cutting in half the time required to prepare the skim milk for inoculation.—Georges Knaysi, *J. Dairy Sci.*, 15: 71 (Jan.), 1932.

**The Effect of Pasteurization upon Brucella Melitensis Var. Suis**—A series of experiments are reported upon the pasteurization effects of bovine and the more heat resistant porcine strains of Brucella. The authors concluded that pasteurization tests, using a standard pasteurizing outfit show that a temperature of 62°–63° C. (143.6°–145.4° F.) applied 3 minutes is sufficient to destroy Brucella organisms, both the bovine and porcine varieties.

This indicates that the usual pasteurization temperature of 62–63° C. for 30 minutes gives an ample factor of safety providing the pasteurizer is operated properly.

With the lid of the pasteurizer open, a much longer time exposure to this temperature is required, and the results obtained are irregular and uncertain in that viable organisms were recovered from the foam even after 30 minutes pasteurization. The absolute necessity of a flush gate valve is also indicated, for in those experiments in which an ordinary faucet outlet was used, viable organisms were obtained

from the outlet after 30 minutes' pasteurization, whereas, with the outlet closed by a stopper on the inside, no living organisms remained after 3 minutes exposure.

These experiments emphasize the importance of carefully conducted operations in pasteurization if successful results are to be obtained.—Charles Murray, S. H. McNutt, and Paul Purwin, *J. Dairy Sci.*, 15: 6 (Jan.), 1932.

## INDUSTRIAL HYGIENE

**The Baltimore Gas Appliance Ordinance and its Relation to Public Health**—The use of gas is, as is well known, attended with danger due to the poisonous effects of its carbon monoxide. Many cities have passed ordinances controlling the sale of gas burning appliances in an effort to prevent the occurrences of cases of poisoning. The author briefly reviews the ordinances of Newark, Los Angeles, New York, Hartford, Berkeley, Pasadena, and Baltimore.

The effects of carbon monoxide in producing both acute and chronic poisoning are presented in some detail which need not be abstracted here.

The steps taken in the development of the Baltimore gas appliance ordinance are described at length. This development should serve as a guide to other cities contemplating the promulgation of ordinances regulating gas appliances.

Finally the results of a study of circulating tank water heaters is described. Eighty-nine heaters were tested. Of these, 64 (71.9 per cent) produced less than the specified allowable upper limit of carbon monoxide, namely, 2 parts per 10,000 of air. Three heaters produced between 26 and 50 parts of CO, two produced from 51 to 100 parts and 2

produced between 100 and 200 parts. In no instance did a registered appliance produce dangerous concentrations of CO. One hot water heater in a kitchen was found to be producing a concentration of 170 parts. When the kitchen was closed tightly and the heater was allowed to burn for 1 hour, the air in the room was found to contain 25 parts of CO per 10,000. These very interesting and valuable studies are to be continued.—Wilmer H. Schulze, *J. Indust. Hyg.*, Feb., 1932, p. 41.

L. G.

**Occupational Diseases in the Wood Industry**—The most frequent symptoms of poisoning from wood are the various forms of skin disease. These affections may vary from a slight reddish irritation to a general eczema. Lesions generally make their appearance on the exposed parts of the body first and then later may spread to other portions. Palpitation, shortness of breath and dizziness may become manifest and in more serious cases there may be systemic effects, such as digestive disturbances, glycosuria, and renal disease.

Oftentimes persons who have once suffered from eczema may develop hypersensitiveness so that the exposure to

dust in a room where these toxic woods are being handled may cause a return of the disease.

There are many varieties of tropical woods which contain toxic principles. For its value as a reference the more important of these may be listed as follows: the wood of the date and coconut palm and the tabago palm all generally known as zebra wood; moule wood of West Africa; ironwood from the West Indies; West Indian greenheart, rosewood or blackwood, satinwood, renghas, amboyna, teak, ebony, boxwood, and others.—*Bull. Internat. Union Woodworkers* (Berlin). Abstr. *M. L. R.*, Feb., 1932, p. 301. L. G.

An Investigation of the Kelley Dust Trap for Use with Pneumatic Rock Drills of the "Jackhammer" Type—The Kelley dust trap consists of a small metal chamber, in form somewhat like an inverted tin water dipper, which is designed to enclose the steel drill rod used in rock drilling, at the point where the drill enters the rock. It does not fit about the drill rod tightly nor does it make an airtight seal at the rock surface. The dust trap is connected to a source of suction by means of a flexible hose.

As a result of these studies, it was found that 60 cu. ft. of air per minute per drill are required in order to maintain the atmosphere in the neighborhood of the worker at 5 million particles per cu. ft. of air, when tested with the Greenburg-Smith impinger apparatus. Certain additional engineering data of value were obtained during the course of this study. These data need not however be presented here.

This is an exceedingly important contribution and one which should have a far reaching bearing on the control of silicosis in rock drilling.—Theodore Hatch, George S. Kelley, and J. William Fehnel, *J. Indust. Hyg.*, Feb., 1932, p. 69. L. G.

Fatigue in Soldier's Due to Chlorine Losses—Pathological fatigue is no longer solely attributed to the accumulation within the body of waste products of muscular effort. Both bodily and environmental conditions directly contribute to it, and an extensive bibliography has been prepared on industrial fatigue by the Committee on Industrial Fatigue and Allied Subjects of the American Public Health Association as well as a valuable Review on Physiological Effects of Abnormal Temperatures and Humidities, by R. R. Sayers and Sarah J. Davenport of the U. S. Public Health Service.

Conditions surrounding military training or actual warfare are often conducive to gross losses of body fluids due to sweating. (A discussion is devoted to the subject of the chemistry and physiology of perspiration, including the amount of water eliminated under certain conditions; likewise, a section on the changes in chloride constituency of sweat, blood, and cellular tissues associated with sweating.)

Among numerous reports indicating the practicability of replacing chloride losses, following profuse sweating, by the addition of sodium chloride, is an instance in which a group of 14 men working in hot mines, where fatigue and cramps prevailed, obtained gratifying results when given 0.25 per cent of sodium chloride to the gallon of drinking water. Likewise, Oswald, Haldane, Marschak and Dukelskaga and others have reported favorably upon the disappearance of symptoms, associated with overheating, through the use of saline solutions. The desire to eat salted meat such as salted red herring among British miners engaged in hot work is undoubtedly a point in illustration. Scores of industries are now supplying salinized drinking water for the purpose of replacing unwanted losses of minerals in sweating. It is felt that the use of tablets of salts for this purpose

are potentially dangerous since they may cause stomach irritation.

As sweating is prolonged the percentage of chlorides increases in the sweat, and in an average case the loss from the body of chlorides approximates 20 gm. per day—much more than would normally be replaced in the chlorides of foods and drinks. Obviously, water alone does not alleviate the condition.

A 0.5 per cent solution of sodium chloride in the face of excessive sweating should promote a sense of comfort and well being, avoid cramps in muscle groups and in the intestinal tract, avoid the deprivation of minerals and water in the tissues, and prevent gastric hyp acidity. The use of 0.5 to 1.0 per cent of common salt in drinking water is recommended for military purposes under all conditions conducive to undue chloride losses in personnel. (Bibliography follows.)—Carey P. McCord, *Military Surgeon*, 69, 6: 608–614 (Dec.), 1931. E. R. H.

**Hydrocyanic Acid Gas Poisoning by Absorption Through the Skin—**This brief contribution presents a review of the literature of hydrocyanic acid gas poisoning by skin absorption.

Three cases of poisoning by skin absorption are briefly described. In all these cases satisfactory respiratory protection was had, yet poisoning occurred when the men were in an atmosphere of 2 per cent of hydrocyanic acid gas. The symptoms developing in 8 to 10 minutes of exposure were dizziness, weakness and throbbing pulse. Several hours after exposure marked weakness, high pulse rate and headache still persisted.—Philip Drinker, *J. Indust. Hyg.*, Feb., 1932, p. 1. L. G.

**A Pressure Chamber Installation for Studying the Physiologic Effects of Pressures Varying from 6 to 60 lb. per sq. in.—**This is a description of an experimental chamber installed at the Harvard School of Public Health for the study of the physiological effects of pressures from 6 to 60 lb. on the human organism.

A description of the apparatus need not be presented here. The apparatus appears to be excellently designed for the purpose at hand and should yield results of value at the hands of the Harvard investigators.—R. M. Thompson, C. P. Yaglou, and A. B. Van Woert, *J. Indust. Hyg.*, Feb., 1932, p. 57. L. G.



# CHILD HYGIENE

## CHILD HYGIENE WORK OF A COUNTY DEPARTMENT OF HEALTH

ON February 1, 1925, the Fourth Demonstration of the Commonwealth Fund Program for Child Health was officially launched in Marion County, Ore. According to the 1920 census, Marion County had a population of 47,177, only a little more than half of which lived in cities, towns and villages. The rest lived in the open country. Local authorities and committees coöperated with the Commonwealth Fund for a period of 5 years, after which time the work was taken over entirely by local authorities and given the name of the "Marion County Department of Health."

A recent report from Marion County states:

Like many other public health activities, child health is not one which can be carried on successfully when only the child itself is concerned. The whole community must undergo considerable improvement before the children will show improved conditions of health.

Marion County has a population of slightly more than 56,000 (exclusive of several state hospitals and institutions), four-sevenths of which is classed as rural; 85 per cent of the people in the county are native whites.

### *I. Prenatal and Maternal Hygiene*

The very beginning of the child health program of any organization starts with the prenatal and maternal hygiene activities. The nurses in the Marion County Health Department, under the direction of physicians, make visits to prospective mothers, giving instructions in general hygiene and diet and advising regular examinations by their physicians. The value of pelvic measurements, urinalyses, blood tests and blood counts, and blood pressure determinations, are explained . . . All deliveries are made by private phy-

sicians, a large percentage of which take place in the hospitals throughout the county.

### *II. Infant Hygiene*

Nurses also call in the homes of the newborn when requested, for the purpose of carrying on some bedside care and general advice to mothers. In this manner many infant lives are saved, for it is during the first day or the first month that most infants die, and if these difficult days are passed without mishap there is a good chance for the infant to develop into healthful childhood.

Copies of birth certificates or birth notification blanks are made out, and so far as possible they are delivered to the home so that the nurse has an opportunity of coming into direct contact with many of the mothers. This also makes it possible for the nurse to urge the mother to have the baby examined regularly by a physician, who can also weigh the infant and give such advice as is necessary for the proper feeding and care of the baby. At this time the mother is given information concerning the advisability of having her infant immunized against diphtheria and small-pox before it reaches its first birthday.

Clinics are conducted regularly throughout the county in 10 different centers, and at more irregular intervals at other places. To these centers the mothers may bring their babies for weighing and examination by a physician. The clinic does not aim to take the infant away from the private physician but serves rather to point out the value of such examinations, and provides an opportunity for urging the mothers to have their children regularly examined by their own physicians if possible. Defects are pointed out and general advice as to care and diet is given. Except in the case of indigent families, mothers are not urged to bring their infants back to the clinic oftener than 3 or 4 times a year, this number of visits being thought sufficient to impress upon the mothers the advisability of regular examinations. Nurses make follow-up calls to see that the instructions received in the clinic are carried out. The nurses in Salem also conduct demonstrations, at which

time the infants are weighed and the mothers are given general information on child care.

From 1925 to 1931 the infant mortality rate for Marion County has drifted downward from 50.1 to 46.5 in 1931; the year 1930 shows the most favorable rate (36.4) of the period. The city of Salem, which lies in Marion County, shows an even more encouraging decrease in rates from 48.7 in 1927 to 33.6 in 1931. This would indicate that more concentration of work in rural districts is needed.

### III. Preschool Hygiene

The activities for preschool children are mainly a continuation of the infant hygiene work. Clinics to which the preschool child is brought are held in conjunction with the infant clinics. The same type of examination is carried out, and the same follow-up system is used. Health habits are given considerable attention in the clinics, and behavior problems are dealt with in so far as the examining physicians are able to advise. The mothers are advised to consult the family physician and the family dentist regularly. Immunization against diphtheria and smallpox is stressed and regular days are given over to immunization clinics throughout the county. About 50 per cent of the preschool children in Salem are now immunized, and for the county as a whole the percentage is probably a little lower.

While no "round-ups" as such are conducted by the health department staff or any other organization in the county in a wholesale fashion, special efforts are made during the summer months to examine and reexamine as many children as possible before they enter school for the first time in the fall. This is done through the regularly scheduled clinics and appears to be much more effective and satisfactory than using wholesale methods. From one-third to one-half of the new entries in school are thus examined before they enter school.

The blank used for recording the results of the physical examination, called the "health record," is one that is used from infancy through the entire school period, but obviously this is possible only because the same organization is responsible for all the health activities of children in the community.

### IV. School Hygiene

In a school population of a little over 12,000 children, about one-third are examined

each year . . . The health department does not endeavor to do any corrective work except for a few dental defects occurring in children from indigent families. The teachers and nurses cooperate in getting the parents to go to the family physician or dentist, or arrangements are made to send the children to hospitals, dispensaries, and the like, for needed corrections.

The teachers are responsible for weighing and measuring the children in their charge at regular intervals. They test the vision and hearing of each child. Daily inspections are made for the presence of contagious diseases, and the nurses make periodic visits to each school to carry on the usual routine matters. Home calls are made, when necessary, by nurses.

Dental examinations are made on all children in school so far as possible each year, by a dentist on the health department staff. He also does a few corrections, but the great majority are made by private dentists. In 1930, 8,630 children were examined by the school dentist, among which number 6,132 were found to have dental defects. Two hundred and seventy-six of them were treated at the health department dental clinic, and 3,054 received corrections at the hands of their own private dentists. Since the school dentist is only working on a part-time basis many defects went uncorrected.

Immunizations against diphtheria and smallpox are urged, although they are not compulsory for school attendance anywhere in the county except in the event of epidemics. Immunization clinics are held each Saturday morning throughout the year at the headquarters of the health department in Salem. In addition to this, immunizations are also carried out in the schools at least once a year. In Salem it has been estimated, by taking a census in various schools, that 67 to 72 per cent of the elementary school children have been immunized against these two diseases, but the percentage in the remainder of the county is probably slightly lower. Because of the low incidence of typhoid fever in the county, no immunization for this disease is offered, careful attention being given to general sanitation for its prevention . . .

In the schools of the county the May Day programs are a prominent feature. On this day special attention is focused on those who have attained a place on the Honor Roll of the schools. To reach such a place the pupils must have shown:

1. Satisfactory practice of health habits
2. Satisfactory behavior and attitude in school

3. Satisfactory nutrition or gain in weight
4. Freedom from remedial physical defects
5. Evidences of immunity to diphtheria and smallpox

In order to impress the teachers with the value of periodic health examinations, they are required to have a complete physical examination at least every two years. This also tends to eliminate those teachers who are not physically fit and those whose health might be a menace to that of the pupils.

V. Communicable Disease Control

The control of communicable diseases constitutes one of the very important functions of the health department and for the most part is concerned with children. Besides checking communicable diseases by isolation and quarantining cases, following up contacts, and making calls on suspects for diagnosis, control measures are carried on, such as immunization, and also improvement in the sanitary conditions.

The following table of communicable disease incidence will show some of the results of this campaign in Marion County.

VI. Tuberculosis Control

Tuberculosis remains a constant menace to the health of the children of Marion County although a very small percentage of them are to be found with active lesions. The majority of those who die of tuberculosis in the county, or those who show clinical signs of the disease, are among adults, but it must be constantly borne in mind that these adults receive their initial infection in childhood. Control work consists in examining and tuberculin testing all contacts, as well as many who have the disease in the active or arrested stage. Clinics for this purpose are held in various parts of the county and nurses carry on follow-up work on all known tuberculosis cases and contacts.

The tuberculosis death rate for the United States in 1930 was between 85 and 90 per 100,000; for Oregon the rate for the same year was 49.6, while the rate for Marion County was 37.4. At the present time the greatest problem in the control of the disease in the county is in the rural sections, almost three times more deaths occurring in the rural sections than in the urban.

	Smallpox		Diphtheria		Typhoid		Scarlet Fever	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
1924	32	1	265	17	9	2	79	1
1925	181	0	165	17	4	1	47	2
1926	53	2	87	2	17	1	71	0
1927	39	0	41	1	28	3	54	1
1928	26	0	23	0	8	0	51	0
1929	36	0	24	1	4	1	56	0
1930	12	0	41	0	4	1	35	0
1931	10	0	20	2	3	0	44	1

PUBLIC HEALTH NURSING\*

The Public Health Nurse and Her Uniform—Public health nurses are constantly making pictures of themselves, and what the world knows of them depends largely upon the kind of picture they present. The line, color and texture of a nurse's clothes play a big part in this picture, and the wise nurse makes them work for her by hav-

ing them express the strength, firmness, robustness of purpose, maturity and dignity for which her profession stands.

Color makes the first impression. It must be practical, attractive and becoming to the majority. Intense colors, like red and yellow, and dull and muddy ones like browns are equally to be avoided. Light or medium blues are good because they are associated with calmness and serenity.

Dark values are better for street uni-

\* Leave out printed matter or other material relating to public health nursing to Eva F. MacDougall, State House Annex, Indianapolis, Ind.

forms. Clear navy blue, oxford grey, forestry green, or the greenish khaki found in some woolen materials are safe choices. Sharp color contrasts like dark blue and white, cream and greenish khaki, etc., put vitality into a costume.

Materials should be heavy enough to contradict any effect of flimsiness or delicacy; they should be sportsmanlike and make up well in a tailored style.

The straight lines are those to be emphasized in a uniform. "A widely pleated straight skirt is better than a more finely pleated one. A gored or a six gored skirt is better than a circular cut. A collar with a plain straight edge is better than a scalloped one. Long sleeves are better than short. . . ." Bows and lace should never be worn. If a pin is worn it should not be a delicate exquisite thing, but one of good size, hardy in character, with no bright and shining jewels.

It is best to have the uniform coat long enough to cover the dress, so there can be a long unbroken line. All the buttons on the coat should function. The coat belt should buckle rather than tie. Large pockets are better than small ones on a coat.

The uniform hat can express the same smart severity and sturdy sportsmanlike character that the good uniform coat expresses. Felt is good material. There is no place for fluffy trimming, perky bows or shining pins, however. If there must be trimming, grosgrain ribbon or a leather band, kept flat, is best.

The shoes should be uniform, too. They should be no more frail than the hat or coat. This eliminates modified oxfords with many cut-outs and shoes with three or more straps. The heels should have a decently large walking surface. It is best to keep the color of the shoes dark. Shoes and handbag should match.

Flowered chiffon scarfs are not to be worn with a uniform coat; they are for

other occasions. A double silk or a soft woolen scarf goes better with the heavy texture of a uniform coat.

Cast-off dress gloves with fancy stitching and wrist bands go as badly with a uniform coat as a flowered chiffon scarf does. Gloves of the simple pull-on type with plain stitching are best.

Dainty lace or embroidered handkerchiefs do not go with the uniform. They should be of good size with a fairly wide hem.

Clothes should fit the times as well as the person and occasion. For instance, the health worker should not wear her belt 5 inches lower than the waist when every other woman has hers at the waist line, nor should she wear her skirt at knee length if medium length skirts are being worn.

To sum up:

The successful uniform of the public health nurse must be a composite expression. It should indicate the high purposes of the profession, recognize the environment where it is worn, suggest current fashion to a degree that reflects the best of the times in which we live, and consider the individual nurse sufficiently to make her feel at home in her professional costume. Its artistry makes the nurse good to look at, and creates a pleasant attention bespeaking confidence. When it accomplishes this, it makes a contribution not many of us know how to perform for ourselves in our own costumes. Such a uniform is a professional asset.—

Bessie Cameron McDermid, *The Uniform—A Professional Asset*, *Pub. Health Nurs.*, XXIV, 2: 95-98 (Feb.), 1932.

Appropos uniforms the *Semi-Monthly News Letter*, West Virginia State Department of Health, Feb. 17, 1932, has this to say under "We All Like Uniforms":

The effect of the neat trim uniform of a public health nurse on the pupils in a rural school was shown recently when one of the boys in the fourth grade asked to be excused from class while the nurse was inspecting the children in the third grade. In a short time he returned with a broad smile, a very clean,

freshly scrubbed face—and his Sunday suit. Thus had the nurse's immaculate appearance brought about a result that the teacher had been working on for weeks.

**Joint Biennial Convention of Three National Nursing Organizations**—Texas will be hostess for the biennial convention of three national nursing associations, the American Nurses' Association, the National Organization for Public Health Nursing, and the National League of Nursing Education, in San Antonio, April 11–15, 1932.

The following program for the joint sessions of the three organizations offers discussions on questions vital not only to nurses but also to the public which stands in need of the commodity which the nurse has to sell, and indicates the realization of a crisis in the profession of nursing and a serious attempt at finding a fair way to meet it:

*Tuesday, April 12*

Subject: Nursing at the Cross-Roads.

A. Implications for nursing in the findings of two 5-year studies.

The Costs of Medical Care Committee.

The Grading Committee.

B. Significant Adjustments in Nursing Service.

C. Partnership with the Public.

*Wednesday, April 13*

Subject: Next Steps for Nursing.

A. How shall we select and prepare the undergraduate nurse?

B. How shall we select and prepare the graduate nurse?

C. How shall we distribute nursing service equitably?

Subject: Mental Hygiene through the Profession.

A. The Growth of Mental Hygiene.

B. A Mental Hygiene Point of View in Nursing.

C. Attempting an Application in the Various Fields of Nursing.

Evening—Subject: The Economic Situation.

Still keeping these larger questions in mind, special groups will meet to dis-

cuss special problems. Private duty nurses will discuss the need for keeping up with new developments and how. The government nurses will give and take ideas about their problems, and the legislative section of the American Nurses' Association will discuss fundamental principles to be incorporated in a nurse practise act.

Board and committee members of public health nursing services will tackle the fundamental problem of how we are to make our services meet the needs with our restricted budgets.

State and official groups of public health nurses will discuss team-play between official and nonofficial agencies and between public health nurses and social workers.

Staff nurses, school nurses, industrial nurses, course directors, state advisory nurses, and teachers will meet in special sessions to discuss questions pertinent to their fields.

This opportunity for the give-and-take of ideas, for the reunion of friends and fellow-workers under the blue sky of Texas, is one which comes at a time when fresh courage which comes from exchanging experiences is greatly needed.

REFERENCES

The N. O. P. H. N. Biennial Program, *Pub. Health Nurs.*, XXIV, 2: 106 (Feb.), 1932.

The American Nurses' Association, *Am. J. Nurs.*, XXXII, 2: 223–225 (Feb.), 1932.

San Antonio is Calling, *Listening In*, N. O. P. H. N., I, 17 (Feb.), 1932.

Preliminary Program, Joint Sessions of Biennial Convention, *Pub. Health Nurs.*, XXIV, 1: 44 (Jan.), 1932.

V. A. J.

**Education for Public Health Nursing Board Members**—The duties of public health nursing board members are to employ a competent executive, keep themselves informed about the work of their agency, develop the agency's program, and interpret its work to the community.

But, as George E. Vincent says in the introduction to *The Board Members'*

*Manual*, "Board members are not necessarily congenitally and automatically endowed with capacities and aptitudes for their duties. They too require special knowledge and technical efficiency." How can the board tell who is a competent executive or interpret intelligently the professional histories of the applicants (if they know where to get them) if they do not know the standards of qualification in this particular field? If the board members are not in touch with what is being done in the whole public health nursing field, how can they judge the accomplishments of their own agency? If they do not know the general objectives of their own program, how can they interpret them correctly to the community?

For several years now public health nursing board members have been trying to equip themselves to meet intelligently the problems of their public health nursing program. They have been holding institutes in various parts of the country at which they have discussed board organization, standards of volunteer service, publicity, community responsibility, etc., under expert leadership.

A special department for board members was set up in *Public Health Nursing*, the official magazine of the National Organization for Public Health Nursing, which deals with their interests. A special section of the biennial convention in 1928 was organized for board and committee members. State nursing

conventions soon followed this example. Later board members developed so much activity that a full-time lay secretary to represent them was added to the staff of the N. O. P. H. N.

A twofold study program for board members was planned last October by the N. O. P. H. N. One part of the program is for city public health nursing groups, the other for rural or county groups. It is interesting to know that 125 boards are working on one phase or another of this program. Some of them are beginning to get interested in knowing what constitutes an ideal program for the health officer in a community and what constitutes good coöperation between the social and health agencies of a community.

Board members are becoming increasingly impatient of fellow members who are content to be on the board, come to occasional meetings, but who are hazy as to what it is all about. Such members are fading out of the picture, or are taking on new life and striving to live up to one of their community privileges and responsibilities. The public health nursing field claims no monopoly of board members alert to measure up to their responsibilities in the organization partnership, but the N. O. P. H. N. is unique in that it is giving thoughtful guidance to this new striving for board education.—Evelyn K. Davis, Board Education, *Mid-monthly Survey*, Feb., 1932, p. 548.

## EDUCATION AND PUBLICITY\*

**N**OW Is The Time—More than ever now is the time for skillful presentation of the claims of health agencies, public and private, for wholehearted community acceptance and support.

And now is the time for critical reviewing of what we have said and done which actually and effectively explains the significance of the agencies which carry on public health activities. The cutting of budgets in some sections seems to imply that we have not done a good enough job of explaining ourselves. This calls for more than "getting our names into the papers." It means more than telling about our activities. Probably the surface indications of general good health may be a handicap at this time. How important is the organized health movement at all times? Have we done what we could to tell the public?

### DATES TO REMEMBER

*Philadelphia, May 15-21, 1932*—This place and date offers the next national opportunity for those concerned with publicity-interpretation-education.

The Social Work Publicity Council will hold luncheon, afternoon, and dinner sessions.

The Educational Publicity Division will hold 5 morning sessions.

The Health Division will hold 5 morning sessions.

The Education and Publicity Headquarters will display many helps for the job, and a wide range of selected samples of publicity. There will be a special demonstration of amateur movies. The Headquarters will offer consultation with specialists in many phases of public presentation of health and welfare topics. Frank Kiernan, of the Massachusetts Tuberculosis and Massachusetts Social Hygiene Associations, is chairman of the session on house organs.

For information address National Conference of Social Work, 82 N. High St., Columbus, O., or Social Work Publicity Council, 130 East 22d St., New York.

Following are some of the topics to be presented:

Creative Writing In Relation To Social Problems; Dilemmas In Public Relations; Small City Newspapers; National Publicity In Support Of Local Campaigns; Can We Have Better House Organs? and What Shall We Tell The Public Next Year?

*Colorado Springs, June 6-9, 1932*—In the sessions of the National Tuberculosis Assn. will be the following topics:

"Place and Function of Tuberculosis Associations in Relation to Child Health Education," Dr. Kendall Emerson; "Essentials of Health Publicity," Dr. Iago Galdston; "Planning and Conducting Successful Public Health Meetings," W. F. Higby; "Cashing In On E. D. C.," Dr. H. E. Kleinschmidt.

*Denver, June 9-11, 1932*—In the meeting of the Western Branch, A. P.

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to LORETT G. KOUTZABA, 130 E. 22d St., New York, N. Y.

H. A., Dr. Walter H. Brown, Stanford University, will present "Adult Health Education," and Prof. Clair V. Langton and Dr. Thomas A. Storey will present "Teaching Hygiene to Teachers."

There will be Demonstrations of Pre-school and Parent Health Education, Intensive School Health Program, and Health Publicity.

**Ask Your Senator or Representative**—A large proportion of the edition of many government publications is placed at the disposal of senators and representatives. So why not first write to one of them when you want a government publication?

**Expanding Section Membership**—Last month the Council of Public Health Education Section had the privilege of accepting as members or Fellows a considerable and representative group from the list of those who had not been affiliated with any Section.

*We welcome you!* We think we have something worthwhile to offer you in the fellowship of this Section. We are confident that you have much to share with us who have been Section members.

*We invite you* most cordially to participation in Section activities.

**What Is Now Being Told**—Probably more state departments send out weekly press releases than are reported below. We list those releases so that those interested may secure copies. Then the wide variety of topics suggests speculation as to the practicability of anything in the nature of a progressive program of popular health education.

*Connecticut*: "Cause and Cure of Cancer"; "Smallpox Spreads From Bridgeport"; "National Negro Health Week"; "Children Made Fit For School Life"; "Food Values Past and Present"; "Prevalence and Nature of Can-

cer"; "Common Cold Not To Be Taken Lightly"; "Syphilis."

*Illinois*: "Personal Habits and Health In Winter"; "Variation In Adaptability Of Normal People to Environment"; "Non-Fatal Danger of Scarlet Fever"; "Water: Public and Private"; "The Peace Problem Between Mankind And Germs"; "The Moon As a Factor in Human Health And Welfare"; "The Shrinking Family And Its Influence On Health"; "The Challenge Of Colds and Pneumonia"; "When A Cold Is Not A Cold" (all radio talks). Releases, without titles, on following: scarlet fever; widows in population; appendicitis; hydrophobia; bovine tuberculosis; health effects of depression; dental defects by occupational groups; automobile accidents; influenza; polluted air; respiratory diseases; tuberculosis sanatoria; physical examination of milk handlers; the food dollar; diphtheria; birth rate decline. Almost all of above are based on Illinois statistics, probably the fullest use made of state statistical data.

*Iowa*: "I See" (defective vision); "Parents Can Eradicate Diphtheria"; "Disease Conditions In 1931"; "Making the Breaks" (value of prenatal information); "Milk" (when raw milk is safe); "Influenza"; "From Pail To Palate."

*Maryland*: "Don't Wait Until The Teeth Ache"; "Keep The Well Children Away From Those Who Have Colds"; "Child Health Conferences"; "Indispensables" (in diet).

*New York*: "How The State Department of Health Protects Your Milk Supply"; "Depression Lunches" (office workers); "The Sanitation Of Our Surroundings"; "How Polluted Water Is Made Safe For Domestic Use"; "Purification of Public Water Supplies." All report radio talks.

*Oregon*: "How to Buy Food at Low Cost"; "Typhoid In Oregon—1909 to 1931"; "Automobile Accidents Are Preventable."

Other frequent press releases we receive come from the following:

*U. S. Public Health Service*: "Rickets"; "The Prevention and Control of Venereal Diseases"; "The Prevention of the Introduction of Diseases From Abroad"; "Medical Care and Treatment of Merchant Seamen"; "Headache" (radio).

*National Society for the Prevention of Blindness*: "Sight-saving Classes"; "The Eye: Its Relation To Safety."

*Dept. of Health, 139 Center St., New York*: "Fake Food Inspectors"; "A Report Card For Parents" (self-check on attention to child's health habits); "More Good News" (health conditions).



*Detroit Dept. of Health* issues for some weeks have been primarily of local interest.

Almost any of the above releases will be sent upon request to public health workers.

In New York State, at least, much use is made of the mimeographed sheets in answering letters.

**A Board of Diet Strategy**—The array of new low cost diet publications suggests an opportunity for leadership by the department or association.

Here is how one health agency went at it: Samples of the available publications were secured; two or three people made a tentative plan for widespread distribution and various forms of presentation; submitted this plan to representatives of all health and welfare agencies, newspapers, schools and other groups which were interested; and laid plans for a period of months.

Thus waste and over-emphasis were avoided, and competitive, helter skelter distribution was done away with.

Copy of a detailed plan for community low diet education will be supplied free.

American Child Health Assn., 450 7th Ave., New York:

*Emergency Nutrition*, by Henry C. Sherman. 4 pp. 3 cents.

*Food At Low Cost*, by Lucy H. Gillet. 4 pp. 3 cents.

Bureau of Home Economics, U. S. Dept. of Agriculture, Washington:

*Adequate Diets For Families With Limited Incomes*. 16 pp. Free.

*Emergency Food Relief And Child Health*. 10 pp. Free.

*The Family's Food At Low Cost*. 4 pp. Free.

*Getting The Most For Your Food Money*. 4 pp. Free.

Children's Bureau, Washington:

*How To Spend Your Food Money*. 1 p. Free.

Mimeographed news release on the above. Free.

President's Organization On Unemployment Relief, 1734 New York Ave., Washington:

*Food And Nutrition Of Our Children*. 4 pp. Free.

Evaporated Milk Assn., 203 N. Wabash Ave., Chicago:

*Feeding A Family At Low Cost*. 13 pp. Free.

"In Conference" at Piketown Garage—Mark Time and Ben Hustler are leading characters in a group that gets together in the Piketown Garage to settle affairs of state. Ben Hustler is the wise chap. The group appear from time to time in the *Public Health News* of the Dept. of Health of New Jersey. In the issue of Feb. 5, 1932, they talk about pasteurized milk. We have lifted the samples below from the middle of a three page discussion:

Ben tilted back until his chair hit the desk, hooked his heels over the one rung and blew smoke at the light bulb, hanging from the ceiling. "I take more stock in what scientific fellers know and can prove than in opinions handed out at the store. I suppose you heard about the cooked taste and that dirty milk is pasteurized to keep it sweet and how somebody's baby couldn't digest pasteurized milk and . . ."

"Yes sir. That's just what they said," agreed Mr. Time. "What about it? Mostly hooey," asserted Hustler. "It's easy to prove that milk which is pasteurized right tastes the same as raw milk. Get a crowd to taste milk from half a dozen bottles of each kind that have no marks on them and see what happens. They'll not be able to tell the difference."

"Don't they pasteurize milk to keep it sweet?" asked Mark.

"Maybe they used to but that isn't the main idea at present. With cleaner milk and cold refrigerators it isn't necessary. Pasteurization now is a kind of insurance against disease being spread by milk. It kills disease germs and makes any milk safer."—M. S. R.

**Good Work Brings a Title**—Paul H. Stevens has been doing such good work in the preparation of *Health*, New Haven Dept. of Health, that he has been given the title of assistant editor.

*Journal of Social Hygiene*, is "under new management" with Jean B. Pinney, as editor, and Doris G. Chandler, as assistant editor.

Horace H. Hughes has left Community Council of Philadelphia to become administrative assistant (largely health education and publicity) of Tuberculosis and Public Health Committee, State Charities Aid Assn., New York.

#### SCHOOLS—CHILDREN

Every month during the school year the Oregon Tuberculosis Assn., 310 Fitzpatrick Block, Portland, sends *Child Health* to the schools of the state. It is filled with stories and articles for pupils and teachers. Several other state and city associations issue material for the same purpose, but Oregon is different in sending a supplement bearing a calendar for the month and an outline poster design selected from contributions from the schools. Every month a new poster topic is announced. "The picture for the February calendar should be about teeth. . . ."

The usable form of the teaching and meeting material sent out by the Division of Infant and Child Hygiene, Indiana State Board of Health, is easily adaptable by states and cities. A plan, a program or an idea to a single mimeographed sheet makes it easy to sort out what any single teacher, parent-teacher association or other group wishes to use. If perforated at the left would there be any inclination to use a loose-leaf binder? In that case could a simple classification be provided? "May Day," "Plays," and so on?

Health Education in Elementary Schools: A Brief Bibliography for Classroom Teachers Who Are Planning Health Education Activities. American Child Health Assn., 450 7th Ave., New York. 5 pp. Mimeographed. *Free*.

Health Education: A Brief Bibliography for Administrators and Instruc-

tors of Health Education in Junior and Senior High Schools. American Child Health Assn. 4 pp. Mimeographed. *Free*.

References for Health Education in the Secondary Schools. From Health Trends in Secondary Education. American Child Health Assn. 17 pp. Mimeographed. 15 cents.

The above are almost perfect bibliographies. They give enough information to help in making a selection from complete titles. *All are dated*.

#### CAMPAIGNS

April, 1932: Early Diagnosis Campaign sponsored by tuberculosis and public health agencies throughout the United States.

May 1, 1932: May Day—Child Health Day. Consult state committees in every state, or American Child Health Assn., 450 7th Ave., New York.

May 2-7, 1932: National Baby Week in department stores over the country which follow the lead of *Infants'* and *Children's Department* (trade journal), 3 East 35th St., New York.

North Carolina is conducting a "State-Wide-Milk-For-Health Campaign." Details of the essay, poster and rhyme contests are given in *Health Bulletin*, State Board of Health, Raleigh. March, 1932.

Again Illinois will observe Health Promotion Week, announced by the Governor for April 24-30, 1932. The following days are scheduled: "Health Sunday"; "Nutrition Day"; "Dental Health Day"; "Immunization Day"; "Parental Inventory Day"; "Screen and Garden Day"; "Child Health Day." Suggestions for each day's program are contained in *Illinois Health Messenger*, State Dept. of Public Health, Springfield. March 1, 1932.

There is danger of over-elaboration of the George Washington commemoration year so that children may wish that he had never been born. But

health workers may wish to consider what his life offers in health teaching values. A few examples of Washington material have been noted.

"Keep Fit Like Washington" quotes Mrs. Burton Harrison on Washington's athletic ability and vigorous physical life. *Schrylkill Health News*, 207 N. Centre St., Pottsville, Pa. March, 1932.

Washington's early fight against disease is noted in "Washington's Greatest Victory." *Health Pilot*, Terminal Sales Bldg., Seattle, Wash.

A few paragraphs on how George Washington caught smallpox and how he struggled against disease are in "Washington and His Travels." *Junior Crusader*, Wisconsin and Michigan Tuberculosis Assn. Feb., 1932.

The Robert Koch 50th anniversary will be celebrated this year by tuberculosis and other health agencies.

#### HELP WANTED

Notes On Tuberculin Testing, and a printed statement to parents comes from the Buffalo Tuberculosis Assn., 708 Ellicott St. Robert W. Osborn, executive secretary, very much wants something better for interesting parents in tuberculin test. What have you?

#### MAGAZINE ARTICLES

If you tell the editor of a magazine that you like his article on health you encourage the publication of more articles on health topics. If you tell an editor in friendly fashion why an article is undesirable you help to guard against more of the same kind.

Birth Control Symposium, by Ernst, Sanger, Dewey, and others. Includes cartoon by Wortman, and "Asiatic Conflict and Overpopulation." *Nation*, New York. Jan. 27, 1932. 15 cents.

"Is Birth Control the Answer?" by Mary Breckinridge. *Harper's*. July, 1931. Frontier Nursing Service; birth control and peasant people.

"Only a Common Cold" (Jan. 9, 1932); "Cold Weather Is Good For You" (Jan. 30, 1932). *Literary Digest*.

"What Good Are Doctors?" by E. Robert. *Atlantic*. July, 1931. Appreciation; history.

"What Mental Tests Mean?" by Z. C. Franklin. *New York Herald-Tribune Magazine*. Jan. 10, 1932. Not to "grade" but to "guide" teachers and parents.

"Won't You Step Into My Parlor?" by T. S. Winslow. *New Republic*, New York. Jan. 6, 1932. 15 cents. Cosmetic credulities and crimes.

#### HONORABLE MENTION

To Philadelphia Health Council and Tuberculosis Committee: For an effective annual report.

A Time of Increased Needs (Title); 12 pages 6 by 9 inches; ivory dull finish paper; 10 point type in two columns; one line heads running over the two columns.

The financial report indicates \$16,664.58 for Health Education Service—Lectures, moving pictures, radio talks, lantern slides, window displays, exhibits, posters, pamphlets, publications, newspaper and periodical publicity, information and advisory service to aid the sick in securing examinations, treatment and care. Also \$20,499.77 for Special Campaigns of Information—On tuberculosis among youth, Philadelphia Tuberculosis Conference, institutes, courses of instruction of health workers, and other activities. Follow-up in the control of cancer.

#### EDUCATIONAL MATERIAL

All new educational material and revised editions issued from national sources will be noted in this column if samples of the publications are sent to the editor. That most issues from some sources have been omitted is due to our inability to secure the material.

Possibly we who mention United States Government publications should remind our readers that unused postage stamps will not be accepted by the Superintendent of Documents or any other government office.

Also we might well remind our readers that most government publications may be secured free upon application to a senator or representative. State and local associations could make a point of emphasizing this opportunity.

Mothers and others may be encouraged to write for the popular government publications, with printed or mimeographed memoranda giving titles and addresses for sending their requests. Before preparing such material it may be well to write to the respective senators or representatives to learn if they will supply them to individuals.

Incidentally, all publications from whatever source should be examined before recommending them to others. Some are too out of date for use; others may not be useful to certain groups.

The official address for most government publications when cash is sent: Superintendent of Documents, Washington, D. C. It is *not* necessary to complicate the address by adding "Government Printing Office."

Foods and Cooking, Supt. of Documents, Washington. *Free*. Revised edition of classified list of government publications.

Ask the Life Extension Institute, 25 W. 43d St., New York, if you wish to receive a goodly succession of printed and letter arguments favoring the health examination.

A Survey of the Medical Facilities of the State of Vermont, by Allon Peebles; Midwives, Chiropodists, and Optometrists: Their Place in Medical Care, by Louis S. Reed; The Amount of Life Insurance in the United States, by Mary Dublin. Committee on the Costs of Medical Care, 910 17th St., N. W., Washington. *Free*.

The next three titles are supplied *free* by Metropolitan Life Insurance Co., New York. This group of publications

is free from confusing ornament, but we regret that they are not dated.

Milk—An All-Round Food. Gives briefly and simply the facts about milk as a valuable food and cautions against using unsafe milk. It replaces "All About Milk." 8 pp.

Yesterday and Today. This new rebus for children about diphtheria prevention tells a story of two children who lived 70 years ago and two who live today. It takes the place of "The Prize Winner." This folder should help keep children smiling at the diphtheria clinic and interest them in being protected against diphtheria.

Standing Up to Life. Gives in combined and condensed form information that was contained in the two pamphlets, "Importance of Posture" and "Foot Health." 12 pp.

The Healthy School Child: What Parents Should Know About School Health Work. John Hancock Mutual Life Insurance Co., Boston. 12 pp. *Free*.

It is most important that parents not only know something of the health work the schools are doing, but that they realize how much this service means to the welfare of their own children, if home and school are to work in harmony in building a race of sturdy American youngsters.

I Give and Bequeath, Buffalo Tuberculosis Assn., 708 Ellicott St., Buffalo. 6-large-page folder, one of the few from health agencies setting forth why a health agency is desirable for mention in wills; warning against giving "for a narrowly prescribed purpose."

Books: Interesting Helpful And New, Public Health Center, Oakland, Calif., is a simple but effectively planned mimeographed folder. Send 2 cents for a copy.

New list of publications; More Milk Smaller Bills (5 pp., revised). Evaporated Milk Assn., 203 N. Wabash Ave., Chicago.

## BOOKS AND REPORTS

**Tables of Food Values**—By *Alice V. Bradley*. Peoria, Ill.: *The Manual Arts Press*, 1931. 127 pp. Price, \$2.00.

This book of tables on food values is a welcome contribution to the literature on nutrition. It is divided into 2 parts; in the first are average servings, and in the second, 100-gram portions of commonly used foods. The headings of the tables, besides the measures and the weight, give the protein, fat, and carbohydrate weight in grams, the total calories, and the mineral shares and value as content of vitamin A, B, C, D, and E, the value as a source of bulk, and the acid or basic reaction of the ash, of all foods. With composite foods, like hash, pies, pastries, puddings, salads, sauces, and dressings, the recipes are written out. In the fore part of the book the sources of information, an explanation of the tables, the functions and sources of various food principles, and the method of using the tables are described. The book fills a long felt want, and should be indispensable for physicians, dietitians, and nutrition workers.

FRANCIS L. BURNETT

**Approved Laboratory Technic. Clinical, Pathological, Bacteriological, Serological, Biochemical, Histological**—By *John A. Kolmer, M.D., and Fred Boerner, V.M.D., assisted by C. Zent Garber, M.D.* London: *Appleton*, 1931. Price, \$7.50.

This volume has been prepared by the authors under the auspices of the American Society of Clinical Pathologists with the object of establishing standards for the performance of lab-

oratory examinations and to secure a wider application of clinical laboratory methods to the diagnosis of disease.

While the technic of the methods has been approved by the American Society of Clinical Pathologists, the particular methods have been chosen by the authors. The book is apparently intended for medical technicians, and the methods are given in such detail in most cases that a novice would have no difficulty in using them, yet in other cases certain details are lacking. Some of the approved methods described apparently are those in use in the authors' laboratory, while in some cases more satisfactory procedures used in other laboratories are not given. For instance, the incision in the heart in order to insert a pipette for making blood cultures probably has no advantage over the simpler method of inserting a sterile capillary pipette through the seared surface.

The book is divided into 5 sections, treating respectively of general laboratory, clinical pathological, bacteriological, serological and clinical methods. The first section includes chapters on the microscope and methods of micrometry, but omits what is considered to be a most accurate method of measuring small objects—the use of the Filar micrometer. Chapter III gives in detail routine and special laboratory procedures for examinations of different body fluids or discharges.

The section on clinical pathological methods is carefully done for the most part. A statement of the accuracy to be expected in counting blood cells would be helpful to the technician. The reporting of negative information as well as positive findings is emphasized.

The procedure for the benzidine test for blood seems to be unnecessarily repeated on pages 137, 172, and 200. The chapter on methods for the examination of urine is well illustrated, while that on feces gives some very useless illustrations, such as the mixing and straining of feces. The method described for the bacteriological control of wounds gives only a relative measure of the bacterial content, though, as originally designed, it attempted to control the quantity of material and the area over which it was spread, two points which are omitted.

Section III gives many procedures in common use as well as others not commonly used at present. The technic for prostatic massage is left to be developed by the laboratory worker. A somewhat cumbersome method of plugging test tubes by crossing long fibered cotton is described.

For the preparation of media, very cumbersome and seldom used methods for the determination of pH are described, including the use of litmus paper and the titration with phenolphthalein as an indicator. In the description of a method for the colorimetric determination of hydrogen ions, it is difficult to understand why the authors chose the Sorensen buffers instead of the easily prepared and stable primary phosphate-sodium hydroxide buffers of Clark and Lubs, which cover essentially the same range of pH. In describing a cumbersome and indirect method of adjusting the reaction of media, the authors vaguely hint at some change in the alkali-binding power of a medium as a result of heating, and use this as an explanation for the need of boiling the mixture when phenolphthalein is used as an indicator. These same buffers are said to interfere with the calculation of the amount of acid or alkali which must be added to a medium to secure a desired pH. An approved technic in many other laboratories where large

quantities of media are to be titrated at different times is the use of a titration curve by means of which the amount of alkali necessary to bring any stated amount of a batch to any desired pH can be easily calculated.

On page 303, the method for streak plates in which only 8 to 10 streaks per plate are made involves the waste of at least half the plate. The authors have apparently missed the point in the use of the McIntosh-Fildes method for cultivation of anaerobes, for the mere presence of an electrically heated coil does not cause an increased oxidation of the hydrogen to water. They obtained the method from Wadsworth's *Standard Methods*, which points out that the catalytic agent, spongy platinum or palladium, is necessary to increase the rate of this oxidation. The approved technic for the acid fast stain, page 312, requires heating of the carbol fuchsin until a precipitate forms. This is what most laboratory workers try to avoid. Diphtheroid bacilli are said to show few if any granules when stained by Neisser's method, which is not the fact in most cases. Ponder's stain, considered by many to be a very useful one for staining granules, is not mentioned, nor is Dorner's stain for spores included in this book of "approved" technic.

The vanillin test for indol, though not recommended by the Society of American Bacteriologists, has the stamp of approval of the authors.

One of the best chapters is on bacteriological diagnosis. The regional distribution of bacteria and other pathogenic organisms is tabulated. On page 329, *Sporotrichia* and *Blastomycetes* are placed in the Gram negative groups, though correctly listed on pages 328 and 332. The chief deficiency in this chapter is in the methods for the diagnosis of fungus infections. No mention is made of animal inoculation for the diagnosis of sporotrichosis. The use of potassium hydroxide in the

preparation of material for the examination and culture of actinomyces is not mentioned.

The remainder of the book, including the sections on serological and clinical methods, is extremely useful and up to date.

Though some of the methods are not what might be considered "approved" in other laboratories, this does not detract from the usefulness of the many others given. If the book should serve only to bring about more uniformity in the use and reporting of laboratory procedures, its place would be well earned.

NEWELL R. ZIEGLER

The Right Honourable Sir Thomas Clifford Allbutt—*A Memoir*—By Sir Humphry Davy Rolleston. London: Macmillan, 1929. 314 pp. Price, \$6.00.

The author rightly characterizes this book as the "life of a great personality," undertaken at the request of Lady Allbutt. He speaks of the difficulties due to the fact that Sir Clifford Allbutt kept very few letters, no diary, left no unpublished reminiscences, and few of his contemporaries are still living.

It is fortunate that Sir Clifford Allbutt was so well known and that he had written so much on medical subjects, and one can hardly credit the author's estimate of the difficulties in view of the excellent work which he has given us. Sir Clifford Allbutt was always a student and made records of his careful observations, which were contributed to a number of leading medical journals. In this country his contributions were well known and his *System of Medicine* especially so. He was always a stickler for good English, including correct pronunciation. It is a safe guess that his book, *Notes on the Composition of Scientific Papers*, is on the desk of every careful medical editor in this country. His book was one of the first of its kind

and others have followed it more or less closely. It remains the standard.

To those who had the great privilege of knowing Sir Clifford personally, this book will be a delight. While he could at times be austere, he was in general a most delightful companion and always the courteous gentleman. With Lady Allbutt, he dispensed at his home in Cambridge a hospitality which those who were fortunate enough to partake of it can never forget. His acquaintance in America was wide, not only through visits, but through entertaining Americans in England.

The make-up of the book is all that could be desired. One feature we commend particularly to the writers of biographies. In the margin, even with the top line of each page, the date is given, in addition to which each year is given as a heading. The style of the author, in addition to its accuracy, is most pleasing. The reading is not only easy, but a pleasure, and on every page one meets either medical friends or those with whose work or writings he is familiar. We commend the book to all, and especially to those interested in the history of medicine and medical men.

MAŽECK P. RAVENEL

The Black Death and Men of Learning—By Anna M. Campbell. New York: Columbia University Press, 1931. 210 pp. Price, \$3.00.

The first third of this little book is a good summary of the more detailed studies which have been made of the 16 plague tractates published between 1848 and 1850. It gives an interesting picture of 14th century opinion with regard to the general causes of the disease (astrological) and the more immediate causes (corruption of the atmosphere). Several of the authors emphasize infection also—particularly one of the Arabic authorities, in spite of the fact that the Mohammedan religion frowned upon this theory. Ibn al-Khatib says:

But it belongs among evident principles that a demonstration evolved from tradition, if it is opposed to the perception of the mind and the evidence of the eyes, must necessarily be subjected to explanation or interpretation. And this, in the present instance, is exactly the idea of many who defend infection.

"The physician of Montpellier" (to whose theories Professor Campbell does not perhaps do full justice) also emphasized the importance of infection.

The last two-thirds of the book is devoted to a discussion of the effect of the Black Death upon the medical profession and the universities. Professor Campbell concludes from some rather fragmentary studies of the vital statistics of small groups that about a third of the intellectual leaders of Europe perished in the epidemic. The universities were very seriously crippled for a time but during the latter half of the century vigorous efforts were made to reestablish learning in its necessary place. One result of the pressure which followed these terrible years was the beginning of a breakdown of the barrier between medicine and surgery and an improvement in the practice of the latter art. The practice of postmortem examination was also greatly stimulated.

To the public health worker perhaps the most interesting material is found on pages 112-119 which traces out the evolution of regulations for isolation and quarantine. In 1348 preliminary steps of this kind were taken in Venice, Florence, Lucca and Pistoia, long before the measures taken by Venice in 1374 and by Ragusa in 1377 which have been commonly cited as the beginning of modern quarantine.

C.-E. A. WINSLOW

**Market Milk.** (2d ed.) By Ernest Kelly and Clarence E. Clement. New York: Wiley, 1931. 480 pp. Price, \$4.50.

The first edition of this book is dated 1923. The rapid changes in milk plant practices and improvements in milk

handling machinery during recent years have led the authors to make a general revision of their work. Changes have been made in tables, illustrations, and the text which tend to bring the work up to date.

The authors have drawn freely from valuable data compiled by the U. S. Department of Agriculture, with which department they are connected. Their extensive practical field experience in market milk problems also adds to the value of this work.

A point of passing interest is the use throughout of the term "treated to kill bacteria" in place of the word "sterilized," in referring to what is commonly called the "sterilization" of dairy and milk plant utensils, equipment and containers.

This revision has materially increased the value of this book as a text or source of general information on the handling of milk during its passage from farm to market.

W. D. TIEDEMAN

**The Care and Feeding of Adults with Doubts About Children—**By Logan Clendening. New York: Knopf, 1931. 317 pp. Price, \$2.50.

This delectable book differs from most of the many tomes on personal hygiene in that it is always diverting and entertaining. The fact that all or most of the material has appeared in such sophisticated magazines as *The American Mercury* and *The Forum* guarantees its readability. The fact does not, however, assure its scientific reliability, and there is much in this book to cause a raising of eyebrows by the orthodox sanitarian.

Although this slightly vertiginous book demonstrates that hygienic information for the layman need not be dull, its very cleverness and its highly disputatious character obscure somewhat the really valuable message in it, which is not to make a fetish of any one aspect of personal hygiene. With this attitude



all progressive sanitarians will agree, but not many will concede the elaborately presented arguments of the author that health examinations for adults serve no useful purpose, that exercise is generally baleful, and that the new knowledge of nutrition is something to be ignored.

In a similar iconoclastic spirit, the author discusses clothes, tobacco, alcohol, sleep, diet, meat, salt, and reducing methods, and he gives vent to serious doubts about modern child care, birth control, sex, and psychology. All of it is written in a sparkling and good humored, if somewhat reckless, manner. There is a rather unfortunate chapter on nursing care, consisting mainly of extensive quotations from Dickens and Ring Lardner.

Every sanitarian will enjoy the book. It is heretical, but skepticism and argument never do much harm when tolerantly considered. The layman will also read it with zest and no doubt will derive profit from doing so. The book is admirably printed, as might be expected from its publishers. On the whole, it is to be recommended as a vivacious contribution to popular health instruction.

JAMES A. TOBEY

### Labor Agreements in Coal Mining

—By Louis Block. Foreword and Preface by Mary Van Kleeck. New York: Russell Sage Foundation, Sept. 14, 1931. 513 pp. Price, \$2.00.

The author, who is statistician with the department of industrial relations of California and was formerly with the Russell Sage Foundation, has sub-titled the present volume, "A Case Study of the Administration of Agreements between Miners' and Operators' Organizations in the Bituminous Coal Mines of Illinois."

In the desirability of establishing better cooperation in industry between labor and management, one is not primarily concerned with the conditions

established or the rates of wages or the hours worked, but in the procedures by which the conditions have been brought about and to what extent the voice of labor has been heard in the process. Also, whether or not a procedure has been successful, it should be fully revealed since the ultimate object concerns the interests of the consumer.

"Coal challenges the capacity of all nations to organize its economic life"; the public often suffering because of adjustments made by force consequent upon labor or the employer being temporarily more powerful. Even the 30-odd years of endeavor in Illinois have not resulted in any formula which could be applied for all times without modifications even in Illinois. Yet it has resulted in 99 per cent unionization of miners and almost complete organization of operators, permitting collective bargaining and the keeping of Illinois mining production on a more enduring peace foundation than perhaps anywhere else in the world. The procedures developed in over 10,000 disputes are considered applicable to other industries.

Documentary material and field studies have supplied the basis of the study. The book offers first-hand material for the use of managers in industry, labor officials and students of labor problems—principally upon how disputes are settled in industry upon a day-to-day basis. The conclusion contains the author's summary of the Miners' Code relating to hiring and reinstating, discharging, mine management, wage disputes, and enforcement. The appendices, of 147 pages, contain agreements, constitutions and a chapter on the explanation of terms used in mining. The volume is well written, well printed and, withal, a bargain in price.

Outside of one's curiosity as to the methods of settling labor disputes, the sanitarian will find very little to interest him here. On the other hand he

will be amazed at the lack of all possible reference to health matters in the labor agreements effected despite the Disraelian observation that the wealth of a nation and, we believe, an industry, lies in the health of its people. This, of course, is no fault of the author's. It is simply the *status quo* and suggests to the sanitarian the question of how to interest the great unions and operators' organizations in a basic fundamental of labor disputes and of wealth, i.e., health.

A report upon the Health of Illinois Coal Miners written by the reviewer, though now somewhat old, may be found in the *Report of the Health Insurance Commission of the State of Illinois*, 1919, pp. 376-402.

EMERY R. HAYHURST

**Annual Report of the Surgeon General of the Public Health Service of the United States for the Fiscal Year 1931.** *Washington, D. C.: U. S. Government Printing Office*, 1931. Price, \$.85

This report is, as usual, full of information of the most interesting character. It agrees with the opinion of the Metropolitan Life Insurance Company that 1931 was an unusually healthy year, which is somewhat surprising, considering the depression and drought, the first of which has affected practically the whole country and the second a large area.

The presence of smallpox is still a blot on our record, though 7 states reported no cases. There was a mild outbreak of influenza during the first part of 1931, but on the whole the record is good. Perhaps the most disturbing occurrence of the year was the outbreak of infantile paralysis, which was more prevalent than for 3 years past, and especially common on the Pacific Coast, in Louisiana, Oklahoma, and a few of the North Central States, including the City of New York. Fortunately the type was mild and the death rate as

well as resulting deformities was low.

Tuberculosis reached a new low, 68.5 per 100,000. In 1900, the rate was 201.9 per 100,000. The difference represents the saving of more than 160,000 lives.

Typhoid fever, which has been a diminishing disease, showed some increase in 1930. In certain states this could be traced to drought conditions and the necessity forced on farmers of taking water from unprotected streams and springs.

Both the case and death rates for diphtheria were the lowest on record. Pellagra on the other hand showed a slight increase, which was expected, and in some states seems to have been due to drought conditions, and resulting poor diet.

The great increase in aerial navigation has brought a new problem to our Service. The Surgeon General has taken part in discussions in Paris, looking to the prevention of importation of disease through infected animals and insects. Excellent experiments have been carried out by officers showing that mosquitoes can be brought from infected ports in the tropics to the United States. Other experiments in this connection concerned the rat proofing of vessels and the use of new, or new forms of old disinfectants.

The report asks for increased facilities to aid in the prevention of disease, including laboratories and personnel. Many other points of interest too numerous to mention in a review are discussed. On the whole, the report is one with which every health officer and sanitarian should be familiar, and it can be commended also to the general profession and the public.

MAZÛCK P. RAVENEL

**The Doctor Explains—By Ralph H. Major, M.D.** *New York: Knopf*, 1931. Price, \$3.50.

This book is another of the crop of

books written by physicians for the instruction of the public. The statements given are, as far as we have detected, correct and authentic. We believe that there is too much history compared to the common facts which would be of value to the non-professional public.

Some of the chapters have headings which do not at all fit. For example, No. VI, "The Dangers of Sugar," is devoted to diabetes, and does not consider the use of sugar in the diet, which, in our judgment, would be of more use to the public than what has been given. The greatest authority on diabetes in the United States does not believe that the eating of carbohydrates produces diabetes.

The style of writing does not hold the reader's attention. The make-up of the book is excellent, and the illustrations are good.

MAZÛCK P. RAVENEL

**Health Protection for the Preschool Child**—By George Truman Palmer, Dr.P.H., Philip Van Ingen, M.D., and Mahew Derryberry. *A publication of The White House Conference on Child Health and Protection.* New York: Century, 1931. 275 pp. Price, \$2.50.

This is one of the most illuminating reports resulting from the White House Conference. It represents an enormous amount of work in the collection of data and administration and computation of results. Those who heard Dr. Palmer give his excellent report at the Conference were much impressed by his graphic presentation and the lessons he drove home on the need for more extensive use of the preventive medical and dental facilities available in many cities and rural communities.

The report attempts to determine the extent to which advantage is taken of the preventive medical and dental services throughout the country. A house-

to-house canvass, made by local representatives of nearly 1,000 different organizations, reached approximately 146,000 children in three-fourths of all cities over 50,000 population, and 37,000 children in rural areas of 42 states.

It begins with an excellent summary of the status of preventive measures. A complete and detailed analysis in tables and easily read charts is a revelation of what is being done—and not done—in those measures which we know to be effective for preserving the health of the preschool child. It forms a valuable addition to our knowledge of the status of the preschool child in the United States of America. The book is beautifully printed and bound.

RICHARD A. BOLT

**Medicine in Virginia in the Eighteenth Century**—By Wyndham B. Blanton, M.D. *Richmond: Garrett and Massie, 1931.* 449 pp. Price, \$7.50.

A scholarly and exhaustive study of medicine, dentistry, and pharmacy in Virginia in the 18th century. The author has made a detailed search of the material available regarding this most interesting period of American history, and presents a vivid and well documented story of the time.

Particularly interesting are the chapters on Plantation Medicine, Revolutionary Medicine, and Washington's Physicians, Diseases and Death. The book is excellently printed and substantially bound. A. W. FREEMAN

**The Nurse's Medical Lexicon**—Edited by Thomas Lathrop Stedman, M.D. *New York: Wood, 1931.* 629 pp. Price, \$2.00.

While naturally based on Dr. Stedman's larger work, *Stedman's Practical Medical Dictionary*, *The Nurse's Medical Lexicon* is not a mere abridgment but a very complete dictionary of au-

thoritative information adapted to the needs of any nurse at any stage of her career. Clear, concise definitions and pronunciations are given for thousands of terms used daily in medicine, surgery, obstetrics, dentistry, bacteriology, anatomy, materia medica, nursing, and hospital management. The definitions are so clearly stated that those with little or no technical knowledge will find them helpful.

A well arranged appendix gives both metric and apothecaries' weights and measures in comparative form as well as comparative temperature scales. A list of poisons and antidotes and a timetable of infectious diseases add to the practical value of the book.

From the viewpoint of a public health worker the definitions which have to do with terminology of public health are somewhat inadequate.

The pages of thin paper, with small but easily read print, are bound attractively in flexible leatherette. The book is of convenient size and easily handled. It should be readily available for every nurse as well as for any person who has frequent occasion to use scientific terms.

VIRGINIA A. JONES

**Protozoan Parasitism of the Alimentary Tract. Pathology, Diagnosis and Treatment—By Kenneth M. Lynch. New York: Macmillan, 1930. xvii + 258 pp., 37 figs. Price, \$3.75.**

This book is the product of years of experience in a part of the United States where intestinal parasitism is not unknown, and the outgrowth of contacts with the problems of parasitology of the digestive tract which only a well ordered and busy clinical laboratory can give. Dr. Lynch has been the go-between in the fields of protozoölogy and medicine over a period of reorganization and progress during which new data as to the extent and variety of the protozoan infections of the human digestive tract

have been revealed, on the one hand by stool examinations, and on the other by the study of tissues from autopsies. In these two fields Dr. Lynch has been both pioneer and collaborator with the practitioners. His book is therefore peculiarly valuable as interpretative of microscopical findings for the physician.

The book contains a discussion of morphology, life history, and occurrence of the principal protozoan parasites found in the human digestive tract, discusses dissemination and prevention of infection, and gives methods for treatment. As in the case of many pathogenic bacteria which may be present in the host without the well known catastrophic results, so also the parasitic protozoa may occur without, at the time of detection, being associated with the usual clinical signs of disease. Perhaps the greater certainty of detection of intestinal protozoans, by reason of their larger size, common habitat, and the prevalence of mixed infections, still further tends to confuse the opinions as to their pathogenicity. It is still quite possible that in certain complexes of conditions they may play very different rôles from those played in other complexes. The author is quite correctly conservative about expressing any far-reaching opinions on these matters, but his book will do much to stimulate inquiry and to aid the inquiring physician and clinical laboratory worker to widen the horizon of his interest and knowledge of this all-too-little tilled field.

C. A. KOROID

**The Story of Medicine—By Victor Robinson, M.D. New York: Albert and Charles Boni, 1931. 527 pp. Price, \$5.00.**

The author opens with a dedication of his work to Sir Ronald Ross in which he points out that "the wittiest of Romans, Horace and Juvenal, mocked the mosquito-net—and the mosquito

that strikes by twilight chanted its triumphant hymn amid the ruins of man's greatest empire." Consecutive chapters treat of the advancement of medicine from the Stone Age to the present, the last being devoted to "Medicine in America." Some 20 pages are given to biographical notes which are well selected and criticised. A good index follows.

Most of the volume deals with the progress of scientific medicine, but considerable space is given to magic, superstition, and quackery. Entirely too much space has been devoted to the gruesome story of the body snatchers and several pages are given to the murders committed by Burke and Hare. We cannot agree with the author that the details of this story belong in a history of medicine written for the public, even though, as he claims, Burke "in 9 months of murder accomplished more for anatomy than all the anatomical teachers in the British Isles." Physicians, of course, are interested in the history of how dissection of the human body was opposed, necessitating the stealing of bodies from their graves, and leading in some cases to murder to supply the demand. The stories have value in showing what doctors have had to contend with. For example, the Royal College of Surgeons in London petitioned against the legalization and regulation of the supply of subjects for dissection, in spite of the fact that a number of great physicians worked for it. The Archbishop of Canterbury, with his tremendous religious and political influence, also refused to recognize the needs of anatomy, and the House of Lords would not even consider the matter. It was not until 1832 that anatomy became a legitimate study, and the body snatcher ceased to exist.

Somewhat the same type of criticism attaches to the author's story of medicine in Rome and Greece. We find

there sketches of the lives of the Caesars which are revolting in almost every detail. The reviewer has gone over a number of the leading histories of medicine written for the profession and as history, and fails to find such subjects discussed. Just why these stories, ending with that of Caligula, should be given in a volume for the public, we fail to understand.

It behooves a historian above all others to be accurate in his statements of fact. The last pages of the book, devoted to American contributions to medicine, are eloquent though perfervid. In his zeal to show what America has done, the author has been led into making claims which cannot be substantiated. He claims for America the discovery that typhus fever is carried by the body louse, though the credit belongs to Nicolle and Conseil, 1909-1910. In the same section, he gives to Noguchi the credit for the discovery of the germ of yellow fever. To use his own language in speaking of Sir William Osler's inclusion of Bishop Berkeley among the "Foremost Contributors" to medicine, this blunder "is inexcusable."

The history of the use of ether as an anesthetic is given at some length and correctly, including the discussion which followed as to whom the credit belonged—there having been four claimants—and the story of Oliver Wendell Holmes, who, when asked to decide, made the witty answer, "To e(i)ther"; yet later in the book the statement is made that "from the Massachusetts General Hospital first arose the vapor of ether that has spread like a benediction over the earth." It would be only fair to mention that chloroform was discovered independently by Liebig, Soubeiran, and Guthrie, all in 1831, instead of giving the credit to Guthrie alone.

The book is well written. Every page fascinates. It gives an intimate discussion of many of the personages of

the past, and abounds in quotations which have come down to us as epigrams and adages. In general, we believe that the book is better fitted for the medical reader than the public, as few physicians, outside of those especially interested in medical history, care to wade through ordinary historical texts, filled, as they often are, with dates and devoid of anecdotes. The printing and general make-up of the book are excellent.

MAZŮCK P. RAVENEL

*L'Hygiène Sociale de l'Enfance* (Health Measures as Applied to Children). *Dr. G. Bannu. Published by Association Internationale pour la Protection de L'Enfance. Brussels, 1930. 1st vol. 717 pp.*

The author, who is a physician in Bucharest, Rumania, and who is actively interested in health work for children, published his report under the auspices of the International Association for the Protection of Children. The book seems to be the most complete account in a foreign language of the theory and practice of infant and maternal health work in a number of countries published in Europe in recent years.

An introductory discussion of eugenics and heredity is followed by a long section on maternal hygiene, which includes the pathological and social factors affecting maternal mortality and its causes and prevention. Statistics on maternal mortality for various countries are also given.

Under the heading "Aid to Mothers" is given a detailed account of medical attendance and various other forms of aid provided for expectant mothers and young mothers of small means in institutions or in their own homes; the work

of mothers' mutual aid societies and of family allowance funds is also discussed. A separate chapter consists of brief statements on the maternal health work in 18 countries, including the United States, and another chapter is devoted to legislation on maternal welfare in a number of countries.

Under the problems of infancy the author takes up physiology, pathology, and growth, and infant hygiene. Particular emphasis is placed on breast feeding, but other methods of feeding are also described.

The author is of the opinion that protection of infant health is primarily the duty of the State. The State should devote its attention not only to mothers without means but also to well-to-do and educated mothers, because they, too, need advice on the proper care of their infants and themselves. Among the various agencies for infant and maternal welfare work the author describes infant health centers in the cities, traveling health centers in rural districts, the work of the visiting nurse, benefits paid to mothers who nurse their own children, mothers' mutual aid societies, maternity homes, and day nurseries. In treating his subjects, the author illustrates the conditions in different countries. In addition, a chapter is devoted to the work done in eight countries, also by the international organizations, such as the Health Section of the League of Nations, the League of the Red Cross Societies, the International Association for the Protection of Childhood, and a few others. Summaries are also given of the legislation in nine countries, including the United States. The last part of the report deals with international statistics of infant mortality and its causes.

IRA V. HISCOCK

# A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Influenza Statistics**—A wealth of findings is recorded in this summary of the statistical survey of the 1918-1919 influenza pandemic. There seemed to be no geographical difference in incidence, which generally was highest among the very young. The complicating pneumonia caused most deaths among young adults.

BRITTEN, R. O. The Incidence of Epidemic Influenza 1918-1919. *Pub. Health Rep.*, 47, 6: 303 (Feb. 5), 1932.

**Anti-Health Education**—The Health educator has not only the work of the quack and the nostrum vendor to undo, but occasionally he must rid the health educational machinery of the monkey wrenches thrown into it by the writers who will give editors anything the latter think the intelligentsia would like to read. This paper is an excellent example as its title suggests.

CLENDENING, L. The Myth of the Magnificent Brute. *The Forum*, Mar., 1932, p. 181.

**Smoke Abatement**—The story of the Schenectady plan for discouraging smoky chimneys. Fire inspectors were used successfully and economically.

COHN, M. "Where There is Smoke—" *Munic. San.*, 3, 2: 60 (Feb.), 1932.

**Esthetic Sewage Treatment**—Modern plants in which sewage is treated without violence to the noses and eyes of nearby dwellers are described and pictured to prove that it can be done.

DONNIS, P. N., and CARLEN, C. H. Camouflaging Sewage Treatment Plants. *Sewage Works J.*, 4, 1: 91 (Jan.), 1932.

**County Health Work**—The principles of rural health administration are presented clearly and convincingly in

this excellent summary of the much discussed subject.

FREEMAN, A. W. Rural Health Administration. *Pub. Health* (Michigan Dept. of Health), 20, 1: 3 (Jan.), 1932.

**Scarlet Fever Isolation**—Provocative indeed is this excellent inquiry into the effectiveness of quarantine regulations. Instead of suggesting a uniform, nation-wide code as some sanitarians have appeared to advocate, the author points out the clinical differences in patients that prompt individual considerations of each case in evaluating communicability.

GORDON, J. E. Epidemiology of Scarlet Fever. *J. A. M. A.*, 98, 7: 519 (Feb. 13), 1932.

**Fighting Pneumonia in Massachusetts**—Telling of the threefold, epidemiologic, immunologic, and case-study project against pneumonia. The results are summarized with the statement that the mortality rates among the patients treated under the state scheme are half the expected rates, a very good showing.

HEFTRON, R. Massachusetts Pneumonia Program. *New Eng. J. Med.*, 206, 7: 328 (Feb. 18), 1932.

**In Praise of Toxoid**—Written for nurses, this review of the advantages of toxoid as the immunizing agent against diphtheria will prove an excellent reference paper for all health workers.

KNOWLTON, M. Toxoid the Next Step in the Conquest of Diphtheria. *Pub. Health Nurs.*, 24, 2: 73 (Feb.), 1932.

**Food and the Eyes**—"Evidence is set forth showing that one of the most constant signs of food deficiency is the pigmentation of the conjunctiva and the reduction of the light sense." So

begins the summary of an important contribution to the subject of nutrition.

LANE, L. A. Practical Points of Ophthalmic Practice. J.A.M.A., 98, 9: 726 (Feb. 27), 1932.

**For Dairy Bacteriologists**—The geometric mean is a more nearly correct average than the arithmetic mean over a normal distribution of bacterial counts of market milk: the latter is unreliable.

ROBERTSON, A. H. Averaging Bacterial Counts. J. Bact., 23, 2: 123 (Feb.), 1932.

**School Child Health Administration**—"The following discussion was prepared primarily with a view of at-

tempting to interest the school physician in the entire field of school health education," begins this article which will interest a great many other health workers as well.

SUNDWALL, J. Health Education and the School Physician. School Physicians' Bull., 2, 1: 6 (Jan.), 1932.

**Diluting Schick Test Toxin**—Diphtheria toxin diluted with aqueous solution of peptone, sodium chloride and phenol retains its toxicity satisfactorily.

WHITE, B., *et al.* An Improved Diluent for Diphtheria Toxin in the Schick Test. J. Immunol., 22, 2: 93 (Feb.), 1932.

## BOOKS RECEIVED

HEALTH AND SOCIAL EVOLUTION. By Sir George Newman. London: George Allen and Unwin, Ltd., 1931. 200 pp. Price, \$1.75.

RONALD ROSS. DISCOVERER AND CREATOR. By R. L. Megroz. London: George Allen and Unwin, Ltd., 1931. 282 pp. Price, \$3.75.

KEEPING MENTALLY ALIVE. By Ethel Cotton. New York: Putnam, 1931. 306 pp. Price, \$3.00.

YOUR CHILD AND HIS PARENTS. By Alice C. Brill and May Pardee Youtz. New York: Appleton, 1932. 339 pp. Price, \$2.50.

ECONOMICS OF FOOD CONSUMPTION. By Edith Hawley. New York: McGraw-Hill, 1932. 335 pp. Price, \$3.00.

HEALTH AND ITS MAINTENANCE. A Hygiene Text for Women. By Bertha S. Dymont. Stanford University: Stanford University Press, 1931. 472 pp. Price, \$3.50.

PREVENTION OF DISEASE IN CHILDHOOD. By Paul L. Parrish. New York: Saunders, 1931. 89 pp.

THE SOCIAL AND ETHICAL SIGNIFICANCE OF NURSING. By Annie W. Goodrich. New York: Macmillan, 1932. 401 pp. Price, \$3.00.

PUBLIC HEALTH ORGANIZATION. White House Conference on Child Health and Protection, 1932. 345 pp. Price, \$3.00.

HUMAN PHYSIOLOGY, 6th ed. Percy Goldthwait Stiles. Philadelphia: Saunders, 1932. 448 pp. Price, \$2.25.

ELEMENTARY BACTERIOLOGY, 2d ed. Joseph E. Greaves and Ethelyn O. Greaves. Philadelphia: Saunders, 1932. 535 pp. Price, \$3.50.

COMMUNICABLE DISEASES FOR NURSES, 2d ed. A. G. Bower and E. B. Pilant. Philadelphia: Saunders, 1932. 358 pp. Price, \$3.00.

UNIVERSITY OF IOWA STUDIES. STUDIES IN CHILD WELFARE. The Development of Mental Health in a Group of Young Children. By Elizabeth Skelding Moore. Iowa City: University, 1931. 128 pp. Price, \$1.15.

A FORTUNE TO SHARE. By Vash Young. Indianapolis: Bobbs-Merrill, 1931. 158 pp. Price, \$1.50.

ARTIFICIAL LIGHT AND ITS APPLICATIONS IN THE HOME. Prepared by the Committee on Residence Lighting, Illuminating Engineering Society. New York: McGraw-Hill, 1932. 145 pp. Price, \$1.50.

DIRECTORY OF PSYCHIATRIC CLINICS IN THE UNITED STATES. Compiled and edited by the Division of Community Clinics of the National Committee for Mental Hygiene. New York: Commonwealth Fund, 1932. 165 pp. Price, \$1.00.

TROPICAL FEVERS. By N. P. Jewell, W. H. Kauntze, and A. T. Stanton. New York: Wood, 1932. 485 pp. Price, \$6.00.

FOODS IN HEALTH AND DISEASE. By Lulu G. Graves. New York: Macmillan, 1932. 390 pp. Price, \$3.50.

INTERNATIONAL STUDIES ON THE RELATION BETWEEN THE PRIVATE AND OFFICIAL PRACTICE OF MEDICINE, WITH SPECIAL REFERENCE TO THE PREVENTION OF DISEASE. Vol. III. By Sir Arthur Newsholme. Baltimore: Williams & Wilkins, 1931. 558 pp. Price, \$5.00.



# NEWS FROM THE FIELD

## SURVEY OF HEALTH EDUCATION ACTIVITIES

THE first comprehensive survey of health education activities in Boston is being undertaken. This study will include the activities of the Boston Health Department, the schools, city medical institutions, private agencies, and commercial groups. The work will be carried on under the supervision of the health education committee of the Boston Health League, of which Clair E. Turner, Professor of Biology and Public Health at the Massachusetts Institute of Technology, is Chairman.

## COLORADO STATE NURSES MEET

THE Colorado State Nurses' Association met at Pueblo on February 11 and 12. Eleanor L. Kennedy, of the State Bureau of Public Health, addressed them on New Mexico's public health organization and the way public health nurses are secured and kept in touch with the latest developments in public health.

## WESTERN BRANCH A. P. H. A.

THE Western Branch Meeting in Denver will be from June 9 to 11. The subjects which western speakers will discuss will include: Consolidation of All Health Services in One Department; Local Health Councils; The Difficulties of Botulism Control in High Altitudes; Diphtheria Immunization; Potability of Farm Water Supplies; The Cause and Prevention of Mottled Enamel (a drinking water problem); Sanitary Control of Shellfish; Relapsing Fever; Health Values of a State Dairy Council; Adult Health Education; The Denver Infant and Maternal Mortality Study; Qualifications of Public Health

Nurses; Generalized Public Health Nursing from the Health Officers' Standpoint; Public Health Nursing Education; Teaching Hygiene to Teachers; The A. B. C.'s of Vital Statistics; A State Mental Hygiene Program; Psittacosis; Coccidioidal Granuloma; Trichinosis; Silicosis and Its Relation to Tuberculosis; and others.

## NATIONAL TUBERCULOSIS ASSOCIATION

IMMEDIATELY preceding the meeting of the Western Branch A. P. H. A. the National Tuberculosis Association will hold its Twenty-eighth Annual Meeting at Colorado Springs, Colo. The dates for this meeting are June 6-9. The program is to be in four sections—Pathological, Clinical, Sociological, and Administrative.

## WORK OF CHILD HEALTH CENTERS IN MEXICO CITY

THE first child health center in Mexico was established by the National Department of Health in 1922 in Mexico City. By the middle of 1931 the number of such centers reached 14 in the Federal District alone, which includes a small territory in addition to Mexico City. These centers, under the supervision of the National Department of Health, give free examination to expectant mothers and children under 2½ years of age and advice on the care of health. In some cases, sick children and women are also treated. Visiting nurses assist the physicians at the centers and follow up the mothers and children in their own homes. In 1930, nearly 6,700 expectant mothers and 11,000 children made 160,000 visits to the centers.

It was found that the rate of still-

births among the expectant mothers attending the health centers was one-third of the rate among the same women before they attended the centers; the mortality rate of the children under 2½ years of age attending the centers was 4.8 per 100 live births against 28 per 100 such births among those in Mexico City as a whole.—*Revista Mexicana de Puericultura*, Mexico City, 2, 13, 1931.

#### KEYNOTE FOR MAY DAY, 1932

##### General Purpose of May Day, 1932

To focus the spirit of this year—which is a spirit of unselfishness, of sharing, of responsibility toward our neighbor—upon the needs of children in order that

Each child may be sheltered in its own home and share secure family life during 1932

Each child may have the essential food elements in each day's diet during 1932

Each child may have an adequate amount of clean and safe milk in 1932

Each child may have plenty of sunshine, sleep, rest and recreation

Each infant in 1932 may be born healthy, of a healthy mother who will live to love her child and take care of her family

and that all

The nineteen points of The Children's Charter—the Magna Carta of Childhood—may be put into practice in every community.—National Child Health Day Committee of the American Child Health Association.

#### COLUMBIA COURSE IN PUBLIC HEALTH

COLUMBIA University announces a new course in public health, as a part of the Home Study Department. The program consists of 2 courses, one a study of preventable diseases, the other a study of public health administration.

#### NEGRO HEALTH WEEK

THE program for the 18th annual observance of Negro Health Week is being arranged by the Annual Tuskegee Conference and other negro organizations in coöperation with the U. S. Public Health Service, city and state departments of health, and various voluntary agencies. The schedule for the week follows:

Sunday,	April 3....	Mobilization Day
Monday,	April 4....	Home Health Day
Tuesday,	April 5....	Community Sanitation Day
Wednesday,	April 6....	School Health Day
Thursday,	April 7....	Adults' Health Day
Friday,	April 8....	Special Campaign Day
Saturday,	April 9....	General Clean-up Day
Sunday,	April 10....	Report and Follow-up Day

#### HEALTH OF YOUNG WORKERS IN GERMANY

PHYSICAL examination of young workers, which is compulsory in many parts of Germany before the issuance of an employment certificate, is also repeated in some cities at a later date. In the city of Kiel one of the public health physicians examined 424 boys before they entered apprenticeship in various trades and examined them again two or more times during their apprenticeship which lasted from 2 to 3 years.

The results of this study prove in the author's opinion the correctness of the prevailing assumption that the physical development of young workers differs in the various occupations. Although this difference is due in part to constitutional variations and to the fact that stronger boys take up more strenuous work, still, the author finds, the occupation itself produces an effect on the growing body.

The more strenuous occupations seem in general to stimulate growth more than the others. This was particularly noticeable in the outdoor building trades, in which, according to the author, even

boys of medium strength showed in the second year excellent progress in their health and physical development, as revealed by a reëxamination.

Next followed the metal trades, in which the boys engaged in the more strenuous processes showed a better progress of physical development than those in less strenuous work. Among the wood-workers and book binders, improvement was slower, even when the boys were in good health at the beginning of their employment. Still less favorable was the situation among the clerks in mercantile establishments; often boys in these establishments who in the beginning were strong and well developed remained behind the boys in other occupations. Least satisfactory were the results obtained among the apprentices in the clothing trades and the unskilled workers, among whom the degree of physical development during the time of apprenticeship was below the average.—*Arch. f. Sociale Hygiene und Demographie*, Berlin, 6, 5: 329, 1931.

#### NORTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION

THE annual meeting of the Northern California Public Health Association was held in San Francisco, January 30, 1932. The election of officers was as follows:

President—Dr. Thomas A. Storey,  
Stanford University

President-Elect—Dr. Herbert F. True,  
Sacramento, Calif.

Vice-President—Dr. Wilfred Kellogg,  
Berkeley, Calif.

Secretary—Dr. Walter H. Brown, Palo  
Alto, Calif.

Treasurer—Mary E. Davis, R.N., San  
Francisco, Calif.

#### MILBANK ANNUAL MEETING

THE tenth annual meeting of the Advisory Council of the Milbank Memorial Fund was held on March 16 and

17. Dr. William Henry Welch, of the Johns Hopkins University, formally resigned as Chairman of the Council, a position he had held since its organization in 1922. His successor is Dr. Livingston Farrand, President of Cornell University.

Dr. Ray Lyman Wilbur, United States Secretary of the Interior, delivered an address on the economics of public health and medical care. He presented and commented on some of the main findings of the Committee on the Costs of Medical Care, of which he is the Chairman.

While this was the tenth anniversary of the Advisory Council, the Fund itself is 27 years old, having been incorporated in 1905.

#### MOTHER'S DAY

THE Maternity Center Association, 1 East 57th Street, New York, N. Y., will be glad to help local organizations everywhere to call the attention of their communities to the vital need for adequate maternity care. Mother's Day is Sunday, May 8. Material for speeches, programs for women's clubs, outlines for church services, and other helps for local campaigns are available free of charge to those interested in improving conditions in their locality.

#### LAETARE MEDAL AWARDED DR. MAHER

THE Laetare Medal has been awarded to Dr. Stephen J. Maher, of New Haven, Conn., internationally recognized authority on tuberculosis, by the University of Notre Dame. The medal is awarded annually to an outstanding Catholic layman. Dr. Maher, who is 71 years old, is the forty-ninth recipient of the award.

#### RESEARCH FELLOWSHIPS

THE National Tuberculosis Association announces a limited number of fellowships in social research as related

to tuberculosis, open to graduate students who have had special training in statistics, social science, or public health. Preference will be given to candidates who are interested in pursuing research in public health after the completion of this fellowship.

The fellowship grants will date from October 1, 1932. They are for a 12-month period and the fellowship grant amounts to \$1,200 for that period with a month's leave for vacation.

Candidates should apply to Jessamine S. Whitney, Statistician, National Tuberculosis Association, 450 Seventh Avenue, New York, before June 1, 1932.

#### INFANT MORTALITY LOWEST IN 1930

**T**HE lowest infant mortality rate ever attained by the cities of this country was that of 1930, according to the Statistical Report of Infant Mortality, based on the records of 860 cities in the Birth Registration Area of the United States, just issued by the American Child Health Association. The 1930 rate—62.2 deaths for every 1,000 live births—is 4 points lower than that of the preceding year, when it was 66.2.

#### REVERE, MASS.

**T**HE first organized effort to induce parents of preschool children to have them immunized against diphtheria was launched by Dr. Francis Licata, member A. P. H. A., Chairman of the Board of Health, in March.

#### THOMAS W. SALMON LECTURES

**T**HE first series of the Thomas W. Salmon Memorial Lectures will be given at the Academy of Medicine in New York, beginning April 8. The lecturer will be Dr. Adolf Meyer, of Baltimore, who was chosen by the committee in charge of the lectures in recognition of his services to American psychiatry.

These lectures were established in honor of the late Dr. Thomas W. Salmon, Professor of Psychiatry of Columbia University, and the first Medical Di-

rector of the National Committee for Mental Hygiene.

#### TYPHOID CARRIERS

**T**HE State Health Department has announced that more than 500 persons in the State of New York are listed officially as typhoid carriers. The state's close supervision of carriers is indicated in the fact that only 7 cases of typhoid were traceable to them, 5 carriers being responsible.

#### PERSONALS

**HELEN TEAL, R.N.**, of Kendallville, Ind., is the new Executive Secretary of the Indiana State Nurses' Association, Indianapolis.

**MARY WALSH, R.N.**, of Gary, Ind., who formerly was part-time Executive Secretary of the Indiana State Nurses' Association and part-time Educational Director for the Indiana State Board of Examination and Registration of Nurses, is now full-time Educational Director of the latter organization in Indianapolis.

**DR. J. NORMAN HENRY** was appointed Health Officer of Philadelphia recently. For 17 years he served at the Pennsylvania Hospital, and was at one time clinical professor of medicine at the Woman's Medical College.

**DR. JOHN G. ANDERSON**, of Fayetteville, O., has been appointed Health Officer of Brown County, to succeed Dr. William L. Faul, of Russellville, O., who retired from active service.

**DR. RAFAEL SILVA**, member A. P. H. A., has resigned from the position of Chief of the Department of Public Health of Mexico, to devote himself exclusively to private practice. Dr. Gastón Melo will succeed him.

**CHARLES GILMAN HYDE**, Professor of Sanitary Engineering of the University of California, was recently appointed consulting sanitary engineer to the Director of Public Health of San Francisco, Calif. It should also

be noted that under the new City Charter of San Francisco the title of the health officer, after January 8, 1932, is "Director of Public Health."

#### DECEASED

GEORGE EASTMAN, founder and chairman of the board of the Eastman Kodak Company, internationally known philanthropist and inventor, killed himself on March 14. He was 71 years of age, and was an Honorary Fellow of the American Public Health Association.

#### CONFERENCES

April 4-8, American College of Physicians, San Francisco, Calif.  
 April 11-15, American Nurses Association, San Antonio, Tex.  
 April 11-15, National Organization of Public Health Nursing, San Antonio, Tex.  
 April 11-15, National League of Nursing Education, San Antonio, Tex.  
 April 19-23, 37th Annual Convention of the American Physical Education Association, Philadelphia, Pa.  
 April 30-May 7, Boys' Week.  
 May 9-10, American Association of Medical Milk Commissions, and the Certified Milk Producers' Association of America, New Orleans, La.  
 May 10-15, Annual Congress of The Royal Institute of Public Health, Belfast, Ireland.  
 May 12-13, Annual Pennsylvania State-wide Safety Conference, Harrisburg, Pa.  
 May 15-21, National Conference of Social Work, Philadelphia, Pa.  
 May 25-27, The Canadian Public Health Association, 21st Annual Meeting, in association with Ontario Health Officers' Association, Toronto, Ont.  
 June 2, 3, State and Provincial Health Authorities of North America, Washington, D. C.

June 6-9, National Tuberculosis Association, Colorado Springs, Colo.  
 June 9-11, Third Annual Meeting, Western Branch, American Public Health Association, Denver, Colo.  
 July 21-29, 100th Anniversary Meeting, British Medical Association, London.  
 July 25-30, Regional Conference of the World Federation of Education Associations, Honolulu, Hawaii.  
 July, 1932, International Conference of Social Work, Frankfurt.  
 August 15-18, International Congress for Light, Copenhagen.  
 August 29-September 3, International Congress of Physiology, Rome.  
 September 6-9, International Union Against Tuberculosis, The Hague.  
 October 12-16, 20th Annual Safety Congress and Exposition, Chicago.  
 October 24-27, 61st Annual Meeting, American Public Health Association, Washington, D. C.

#### School of Hygiene and Public Health of the Johns Hopkins University

The fifteenth session begins October 3, 1932

Opportunities for instruction and investigation will be offered in Public Health Administration, Epidemiology, Bacteriology, Immunology, Protozoology, Vital Statistics, Sanitary Engineering, Helminthology, Physiology as applied to Hygiene, Chemistry as applied to Hygiene, Sanitary Law, Personal, Social and Mental Hygiene, etc. Practical work is provided through the assistance of the city and state departments of health and other organizations, and arrangements are made for field work during the summer. Courses are organized on a quarterly basis, each quarter consisting of approximately eight weeks. Students may enter the school as candidates for a degree or as special students at the beginning of any quarter. Men and women are admitted on the same terms.

Courses are arranged leading to a Certificate in Public Health, and to the degrees of Doctor of Public Health, Doctor of Science in Hygiene, and Master of Science in Hygiene. The details in regard to the requirements for matriculation in these courses will be forwarded upon application.

For further information or catalogue address:

DEAN, SCHOOL OF HYGIENE  
AND PUBLIC HEALTH  
615 North Wolfe Street  
Baltimore, Maryland

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### Intermittency in Growth as an Index of Health Status

C. E. TURNER, DR. P. H., F. A. P. H. A. (*Life Member*),  
ELLEN LYTLE, AND CHARLOTTE WINNEMORE, M. D.

*Department of Biology and Public Health, Massachusetts Institute of  
Technology, Cambridge, Mass.*

CHILDREN in the public schools are commonly weighed each month to observe growth, but their weights are no longer compared with height-weight averages to determine which children are "underweight." The present procedure is based upon studies<sup>1,2</sup> which have shown the limitations of underweight as a health index, and upon experience which shows that the child's interest in watching his growth is a motivating factor in the development of health habits.

It is a recognized fact that growth among healthy children is a reasonably continuous process. What is the significance of intermittency?

We have sought to determine the answers to the following questions:

1. To what extent does intermittency occur among school children in the first 6 grades?
2. Is intermittency in growth usually associated with unhygienic living, physical defects or illness?
3. Can intermittency be used as a method of screening out public school children who need special attention?

Children in 6 of the elementary schools of Malden, Mass., were weighed once a month on the same day each month and at the same time of day, with shoes on, by the classroom teacher. A classroom weight record was kept of each monthly weighing.

In order to determine the amount of intermittency, we examined the records of 971 children, 6 to 12 years (see Figure I). For the school year 1929-1930 we found that 16 children, or 1.7 per cent of

## FORM USED—INDIVIDUAL HEALTH CONFERENCE (1930)

1. Name
2. Grade ..... School ..... Teacher .....
3. Age
4. Last Height
5. Weights
6. Average Weights
7. Physical Record from Classroom Physical Record Card
  - A. Defects recorded by doctor
  - B. Corrected ..... Date .....
  - C. Uncorrected
8. Illness during last 3 months
  - A. Nature
  - B. Time and duration
  - C. Absence from school
  - D. *Medical care during illness*
9. Teacher's Remarks
  - A. Frequency of absence
  - B. Nervous condition
  - C. Type of home environment
  - D. Interest and ability in work
10. Health Habits (Record of last 24 hours)
  - A. Intake and Elimination
    1. Number glasses of milk at home ..... school .....
    2. Breakfast
    3. Lunch
    4. Dinner
    5. Candy
    6. Food between meals
    7. Amount of water
    8. Bowel movement
  - B. Rest Habits
    1. Bed time
    2. Rising time
    3. Time between supper and bedtime
    4. Activity before bedtime
    5. Number sharing room
    6. Number sharing bed
    7. Windows open
    8. Rest periods during day
  - C. Outside Activities
    1. After school
    2. Outdoor play
    3. Outside lessons
    4. Outside work
    5. Saturday and Sunday recreation
11. Additional Remarks
 

Number in family

Mother living

Father living

Father working

Any other members of family working

the group, had gained weight each month; 42.1 per cent of the group failed to gain in one or more monthly periods but never failed to gain over a 2-month period; 36.6 per cent failed to gain over one or more 2-month periods but never failed to gain over a 3-month period; 15.4 per cent failed to gain for a 3-month period but never for a 4-month

period; 3.3 per cent failed to gain for a 4-month period but never for a 5-month period; 0.9 per cent of the group failed to gain for 5 months in succession. Figure II shows that the distribution of intermittency for the different ages is approximately the same.

During the last half of the school year 1929-1930 we gathered additional data concerning 95 children (Group I) who had failed to gain for a period of 3 months within the school year. (Eight children in this group gained  $\frac{1}{4}$  pound during the 3 months in question, the others showed no gain or loss.) In September, 1930, we gathered similar data concerning a control group of 100 children in the same schools (Group II) who had gained regularly, that is, children who had never failed to gain over a 2-month period during the preceding school year. Four of these children had shown a gain each month and none had failed to register a monthly gain more than twice.

The present study compares the children who failed to gain over a 3-month interval with those who gained regularly. The information concerning these children was secured from the physical record cards of the school system, and by means of a physical examination to which parents were invited. The scholastic ability of the child was rated by the teacher. At the same time an individual health habit conference took place between a health education worker and the child, and the child's program for the previous 24 hours was reviewed as an index of his health behavior. The nature of the data collected at these conferences may be seen from the form used.

Table I shows some interesting data regarding the nature of these children.

TABLE I  
NATURE OF GROUPS STUDIED

	Group I	Group II
Number of children	95	100
Children of good mental ability	52	55
Children of fair mental ability	23	26
Children of poor mental ability	20	18
Large family (5 or more)	51	59
Families with more than one wage earner	4	12
Children whose mothers work	14	10
Fathers out of work	5	6
Fathers not living	5	4
Mothers not living	2	3
Children working outside daily	7	5
Children working outside one day or more weekly	12	6
Children taking some outside lessons	26	29
Parents present at physical examination	56	56

The distribution of good, fair and poor students was practically identical in the two groups. There was no appreciable difference in the number of parents who attended the physical examinations, in the



FIGURE I

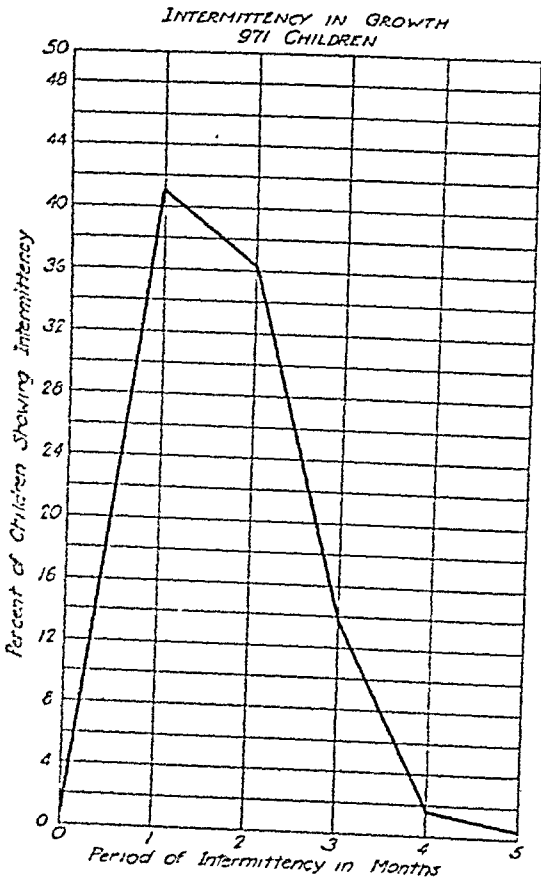
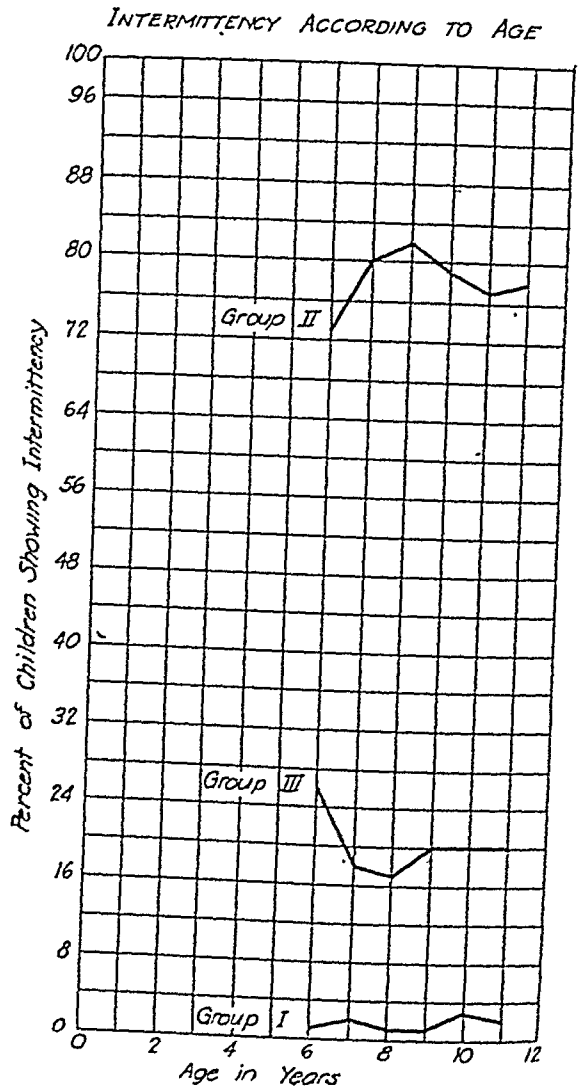


FIGURE II



Group I - No Intermittency (13 Children).  
 Group II - 1 Mo. or 2 Mo. Intermittency (740 Children).  
 Group III - 3 Mo. or Longer Intermittency (187 Children).

number of children taking lessons of some sort outside of school, in the number of children coming from large families, or in the number of children whose father or mother was not living. There is some suggestion that the children in the consistently gaining group were in somewhat better economic situations because in more cases there was a second wage earner in the family, in slightly fewer cases were the mothers gainfully employed outside the home, and in somewhat fewer cases were the children regularly and gainfully employed outside of school. In short, these two groups of children taken from the same schools seem alike in mental ability, in general home and social conditions, and not greatly different in economic status.

Since the children studied were drawn from a rather wide age group, Table II is inserted to show the distribution according to age.

In gathering information concerning the habits of the children during a 24-hour period, care was taken to avoid any embarrassment on the part of the child in stating frankly what had taken place. Pupils

TABLE II

AGE DISTRIBUTION AT BEGINNING OF PERIOD OF STUDY

Age	Group I	Group II
6 .....	13	15
7 .....	24	17
8 .....	14	16
9 .....	11	22
10 .....	14	16
11 .....	10	8
12 .....	7	6
13 .....	2	0
	<hr/> 95	<hr/> 100

can remember what they did during 24 hours preceding the conference, and experience has shown that much more accurate data can be obtained in this way than by inquiring what they "usually do." See Table III.

It will be seen that faulty health behavior was much more common in the children who had failed to gain over a 3-month period. In comparing breakfasts we find that Group I showed twice as many children who failed to have milk. The difference in the numbers of children having cereal or bread is probably not significant since one is often a

TABLE III

A COMPARISON OF HABITS BASED ON THE STUDY OF A 24-HOUR PERIOD

	Group I 95	Group II 100
Number of children in group		
Having for breakfast—		
No cereal (egg allowed as substitute)	20	27
No milk or cocoa	32	14
No toast or bread substitute	20	13
No fruit	65	71
Having no meat, fish or egg protein	27	12
Having less than 3 glasses of milk *	51	34
Having no vegetables besides potato	47	34
Having no fruit	52	34
Having tea or coffee	6	5
Having inadequate sleep	31	20
Having less than 4 glasses of water	38	50
Having no bowel movement	4	4
Having no outdoor exercise	7	6
Having windows closed at night †	15	3
Having no fruits or vegetables besides potato	29	14
Having less than 3 glasses of milk and no meat, fish or egg	13	5
Having inadequate liquid (less than 4 glasses of water and less than 3 glasses of milk)	21	17
Having inadequate milk and no fruit or vegetable	21	6
Having no cereal or bread for breakfast	3	4
	28	11

\* Of this group those who had no milk or cocoa for breakfast were

† These figures are not comparable because the data for Group I were taken in the winter and those for Group II in September.

substitute for the other, and since we find only 3 in Group I and 4 in Group II who did not have either cereal or bread. There is only a slight difference in the number of children who failed to have fruit for breakfast, but 52 in Group I failed to have any fruit during the day, while only 34 in Group II reported such failure. Group I had 17 more children than Group II who received less than 3 glasses of milk, and 15 more who had no source of protein except milk.

When we look up the number of children who had less than 3 glasses of milk and no other protein, we find 13 in Group I and 5 in Group II. We find 29 in Group I who had neither fruit nor vegetables besides potato, but only 14 in Group II. There was no significant difference in the number of children who had tea or coffee, the number who failed to have a bowel movement, or the number who failed to play out of doors. Nearly all in both groups had a satisfactory record in these respects.

Appreciably more of the children who had failed to gain showed inadequate hours of sleep. (Inadequate sleep was based on the following standard:  $11\frac{1}{2}$  hours at ages 6 and 7, 11 hours at ages 8 and 9,  $10\frac{1}{2}$  hours at ages 10 and 11, 10 hours at ages 12 and 13.)

The question of liquid intake is somewhat confused by the fact that some children may substitute milk for water at certain times of the day. In order to determine the number of children having inadequate liquid, therefore, we determined the number who had less than 4 glasses of water and less than 3 glasses of milk, finding 21 in Group I, and 17 in Group II.

In order to secure some index of the number of children having low vitamin intake, we checked those having less than 3 glasses of milk and no fruit or vegetable during the day. There were 21 in Group I and 6 in Group II.

In order to get data on the more serious faults let us compare the children with respect to 5 items of behavior: (1) inadequate protein (less than 3 glasses of milk and no meat, fish or eggs), (2) low vitamin intake (less than 3 glasses of milk and no fruit or vegetables), (3) inadequate sleep, (4) inadequate liquid (having less than 4 glasses of water and less than 3 glasses of milk), and (5) deficient roughage (having neither fruit nor vegetable besides potato). Table IV shows the number in each group deficient in none, 1, 2, 3, 4 or all 5 of these. The number of children in Group I whose health practices were at fault with respect to 2 or more items is 33 as compared with 12 in Group II. The reader may be struck by the fact that 33 of the children who had failed to gain were at fault in none of these particulars. Most of these were suffering from recent illness or from physical defects.

Of course these data do not pretend to present a complete, accurate, and adequate picture of health behavior in the two groups; but they do show a significant difference.

TABLE IV

NUMBER OF CHILDREN HAVING INADEQUATE PROTEIN, VITAMINS, SLEEP, LIQUID OR ROUGHAGE

No. Items Wrong	Children in Group I	Children in Group II
0	33	54
1	29	34
2	18	8
3	8	4
4	5	0
5	2	0
Total	95	100

Table V compares the two groups of children with respect to the number of physical defects sufficiently serious, in the judgment of the examining physician, to require correction or treatment.

TABLE V

PHYSICAL DEFECTS REQUIRING CORRECTION

	Group I	Group II
Number of children	95	100
Enlarged cervical glands	2	0
Posture (drooping)	8	1
Nutrition	4	2
Teeth	49*	48*
Feet	1	1
Tonsils	12	6
Tonsils (corrected)	45*	60*
Scalp	1	0
Sight	0	2
Eyes (not vision)	1	0
Hearing	5	1
Ears (not hearing)	3	2
Skin	4	1
Heart	1	0
Lungs (dullness)	2	0
	44	16

\* Items not included in totals.

It will be seen that there were nearly 3 times as many physical defects in Group I as in Group II. A few items are especially worthy of note. The only defect more common in Group II than in Group I was vision. On the other hand, defects of the lungs, heart, and cervical glands occurred only in Group I, and defects of hearing, skin, tonsils, posture and nutrition were relatively more common among these children whose growth record was poor. The number of cases of seriously defective nutrition was small. The basis of this diagnosis was the judgment of the physician using many indexes, including particularly

the condition of the subcutaneous tissue. If the fallacious practice of diagnosing malnutrition upon the basis of 10 per cent underweight had been followed, we should have recorded approximately 40 such children. It is interesting that appreciably more children in Group II had had corrective treatment for diseased tonsils.

Of course physical defects varied in severity; not every physical defect would interfere with growth; and the same type of physical defect might or might not interfere with the growth of a child according to his health status in other respects, or according to whether or not his mode of living was sufficiently good to allow him to overcome the drain which this defect might put upon the system.

Table VI shows the number of children with 1, 2, or 3 of the above defects.

TABLE VI  
DISTRIBUTION OF PHYSICAL DEFECTS (TOOTH DEFECTS NOT INCLUDED)

Number of Defects	Number of Children	
	Group I	Group II
1	14	12
2	9	2
3	4	0
Total	27	14

Records of the illnesses of these groups of children were secured. For Group I we have data for the 6 months during which the intermittency of growth occurred; for Group II for the 10 months of the school year. Table VII shows that when reduced to the same time basis, the incidence of disease was almost twice as great in Group I as in Group II, while the incidence of common cold was over 4 times as great. The non-communicable diseases or conditions in Group I re-

TABLE VII  
ILLNESSES

	Group I		Group II	
	No. Cases	Av. No. Cases Monthly	No. Cases	Av. No. Cases Monthly
Children studied	95		100	
Months included in study	6		10	
Cases of cold and grippe	28	4.6	11	1.1
Chicken pox	6	1.0	5	0.5
Whooping cough	9	1.5	11	1.1
Scarlet fever	0	0	1	0.1
German measles	0	0	1	0.1
Mumps	3	0.5	8	0.8
Illnesses from non-communicable diseases	9	1.5	11	1.1
Total number of cases	55	9.1	48	4.8

ceiving treatment included tonsillectomy, digestive difficulty, tonsillitis, asthma, swollen glands, and ear trouble, while in Group II they included tonsillectomy, tonsillitis, severe nose bleed, appendectomy, ear trouble, fractured skull, burn.

A disease might or might not interfere with growth according to its severity, the care received by the patient, or the condition of the child in other respects.

We have seen that the children who have gained regularly have a superior record in habits, illness, and physical defects. It seems worthwhile to compare the number of children in the two groups suffering from deficiencies in each of these respects and from combinations of such deficiencies. Table VIII gives the result of such a study.

TABLE VIII  
COMPARATIVE CONDITIONS OF CHILDREN

Health Deficiencies	Number of Children	
	Group I	Group II
None observed	4	17
Defective teeth and one faulty habit only	18	24
Two or more faulty habits only	8	6
Illness only	27	36
Physical defects only	4	9
Poor habits and illness	12	4
Poor habits and physical defects	8	1
Illness and physical defects	8	2
Poor habits, illness and physical defects	6	1
	<hr/> 95	<hr/> 100

It should be explained that the basis of judging habits here is that used in Table IV and the children are divided into habit groups according to whether they are at fault in none, 1 or more of the 5 fundamental health practices mentioned. Considering faulty habits, illness and physical defects, it will be seen that most of the children in Group II suffer from only 1 of these conditions, only 8 per cent of these children being deficient in more than 1 respect, whereas 36 per cent of the children in Group I are deficient in 2 or in all 3.

#### SUMMARY

The extent to which children fail to gain over different periods of time was determined. Weighings would have been somewhat more accurate without shoes. It is probable that because of the more rapid growth at the adolescent period these findings for elementary school children would not apply to those in the junior and senior high school.

Children who have failed to gain for a 3-month period reflect appreciably poorer health habits and definitely lower health status than

those who have gained regularly. Nearly 3 times as many in the former group (33:12) have 2 or more important unhygienic habits; serious physical defects are nearly 3 times as numerous among them (44:16); nearly twice as many (27:14) have such defects; illness is nearly twice as common (9.2:5). The number of children defective in 2 or all 3 of these respects is over 4 times as great (34:8).

Intermittency in gaining weight does not draw a sharp line between the children who seem to need attention and those who do not; but it is more commonly accompanied by departure from normal health than is regular growth. (Obese children usually gain regularly and too rapidly. This screening is not applicable to them.)

There are always differences in the seriousness of the defects recorded and in the vitality of individual children. The relatively few who showed regular gains, although burdened with a combination of unhygienic habits, illness and defects, appear to have had sufficiently good natural vitality or home care to maintain growth in spite of these conditions.

A few children, 4 per cent, showing intermittency for 3 months, exhibited no departure from normal. A somewhat larger group, 18 per cent, showed only minor difficulties. It may be that our studies failed to reveal existing defects, unhygienic habits or departures from normal organic health. It may be that nervous fatigue, worry over school work, or some other unobservable factor interfered with growth. It may be that a few children who are maintaining a reasonably satisfactory state of health show intermittency to this degree.

#### CONCLUSION

Since school children are weighed regularly anyway and since children who have failed to grow for a 3-month period show a much poorer condition in respect to habits, illness and physical defects, it seems worthwhile for the teacher, school nurse and school physician to give them individual attention in order that unhygienic living may be discontinued, complete recovery from illness secured, physical defects corrected, and in order that children needing continuing medical care may be referred to the family physician.

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# Meaning of "Antiseptic," "Disinfectant" and Related Words\*

AUSTIN M. PATTERSON, PH. D.

*Antioch College, Yellow Springs, O.*

THE use of technical and semitechnical words in commerce has increased rapidly with the development of research and the growth of advertising. The modern market affords an amazing variety of articles, the manufacture, merits, and use of which are discussed in a voluminous literature.

It is desirable that the scientific terms employed should convey clear meanings to all concerned, or at least not give a wrong understanding. Words do not always have one simple sense. A language is a living, growing organism, and its words take on color, gain fresh content, acquire new senses and lose old ones as the years pass. It is the task of the dictionary worker to discover and set forth the present meanings of words in the light of their history.

In this article definitions and comments are presented for the following terms: antiseptic, bactericidal, bactericide, deodorant, deodorize, disinfect, disinfectant, disinfection, disinfest, germicidal, germicide, insecticidal, insecticide, prophylactic, sterilization, and sterilize.

The conclusions are based chiefly on a study of the more widely disseminated literature in English, especially reference books both scientific and general, but also on conversations and correspondence with physicians, bacteriologists, government officials, manufacturers of chemicals, and laymen.

## GERMICIDE, -DAL

### *Definitions—*

*germicide, n.* Anything that destroys germs (microörganisms); applied especially to agents that kill disease germs.

*germicidal, adj.* Destroying germs; pertaining to germicides.

*Comments—*The word *germ*, in the sense of microörganism, is a popular one, but it has been used in forming the convenient terms *germicide* and *germicidal*, which find extensive use in technical as well as popular literature. There seems to be little disagreement as to the meaning of these terms: a substance is a germicide if it will kill germs and whether or not it will do so can be experimentally deter-

\* The investigation herein reported was conducted with the aid of a grant from the Insecticide and Disinfectant Manufacturers' Association.



mined. As the words are ordinarily used, the germs referred to are those of disease. The chief point of controversy that could arise is with reference to differences in resistance. In practice it is assumed that a substance represented as a germicide, when used as directed, will kill all ordinary disease germs, but is not necessarily required to be capable of destroying bacterial spores. In combating diseases such as anthrax or tetanus, caused by spore-forming bacteria, germicides or procedures specially effective against spores will be required.

#### BACTERICIDE, -DAL

##### *Definitions—*

*bactericide, n.* Anything that destroys bacteria.

*bactericidal, adj.* Destroying bacteria; pertaining to bactericides.

*Comments—*These terms are synonymous in large part with *germicide* and *germicial*, the chief difference being that the two latter are somewhat broader, inasmuch as they may include microorganisms other than bacteria. *Bactericide* is a precise term applying only to bacteria and to bacteria of all kinds; in practice, however, it is ordinarily regarded in the same light as *germicide* with respect to the resistance of different bacteria; that is, a substance, in order to be called a bactericide, is not necessarily required to be capable of destroying bacterial spores.

#### ANTISEPTIC

##### *Definitions—*

*antiseptic, n.* A substance that opposes sepsis, putrefaction or decay; one that prevents or arrests the growth or action of microorganisms, either by inhibiting their activity or by destroying them; used especially of agents applied to living tissue.

*antiseptic, adj.* 1. Having the properties of an antiseptic; opposing sepsis, putrefaction or decay; preventing or arresting the growth or action of microorganisms, especially on or in living tissue. 2. Pertaining to, or characterized by, the use of antiseptics; as *antiseptic surgery*.

*Comments—*The word *antiseptic* is derived from two Greek words, *anti*, against, and *septikos*, putrefactive or rotting. The first known use of it in English, both as an adjective and as a noun, is (according to the *Oxford English Dictionary*) in the *Gentleman's Magazine* in 1751, where sea salt, myrrh and acids are spoken of as antiseptics. In 1774 Priestley remarked on the antiseptic power of "nitrous air" (nitrous oxide). At the time that the word came into existence it was not understood that putrefaction and decay are produced by the agency of microorganisms, but when this became known, the "preventing or arresting the growth or action of microorganisms" took its place naturally in the idea conveyed by the word. Apparently the earliest use of the term was with reference to substances to be applied as medicaments to sores and wounds, and the principal use even today is of substances applied to some part of the body, either externally or internally. The word *antiseptic* might be, and has been, applied to substances used to prevent decay in other connections, as of foods or timber, but such materials are usually called *preservatives* rather than antiseptics. It will be noticed that, as "antiseptic" is used, it may imply long-continued contact.

*Antiseptic and Germicide—*Since the killing of microorganisms is the most effective way to prevent their growth it would seem a logical conclusion that any germicide may act as an antiseptic. This appears to be the prevailing view. A great many writers who discuss the matter state or imply that an antiseptic may act either by inhibiting the growth of microorganisms or by killing them. A smaller

number, however, limit the action of an antiseptic to the prevention or arresting of bacterial growth *without* killing the organisms.

Now it is quite natural that, since we have other words such as *germicide* and *bactericide* to denote agents which actually kill microorganisms, the idea that an antiseptic may arrest growth without killing should be emphasized; but the majority of writers do not go so far as to contrast *antiseptic* with *germicide* and to regard the two terms as mutually exclusive. It seems best in accord with the history of the word and with prevailing usage to apply the term *antiseptic* to any agent which prevents further bacterial action, whether it does so by killing the bacteria or not. If this view be taken, any germicide might theoretically serve as an antiseptic. In practice there are exceptions. The action of certain non-material agencies, as sunlight and heat, is often referred to as germicidal but not as antiseptic. Again, many germicides cannot be used as antiseptics because of their harmful effect upon the body tissues. Bearing such exceptions in mind, however, we may say that in general a germicide is an antiseptic or has antiseptic properties.

On the other hand, it is not correct to say that an antiseptic is necessarily a germicide or has germicidal properties, for there are substances which are able to arrest the growth of microorganisms but are not germicides. Here again usage is not unanimous, for certain writers, chiefly those influenced by the practice of antiseptic surgery introduced by Lister, regard the action of antiseptics as a destroying one.

In an investigation of the relative number of authorities supporting each point of view, 165 definitions of *antiseptic* were studied, ranging in date from 1819 to 1930. Twenty, mostly early, make no reference to bacteria. Of the remainder, 66 state or imply that antiseptics arrest or destroy microorganisms, 27 state that they arrest but do not destroy, 12 that they destroy, and 10 that they inhibit growth (without stating how). Most of the remaining 30 definitions are not entirely clear, though a few represent divergent views, for example, that antiseptics neutralize toxins.

To illustrate recent usage on this point, 53 citations from works published in 1921 or later may be summarized as follows: (1) Describing an antiseptic as inhibiting or preventing the growth of microorganisms without necessarily killing them, 37. Of these, 12 are from bacteriological, 11 from medical, and 14 from miscellaneous sources. Three say definitely that antiseptics do not kill bacteria, and 4 more distinguish between antiseptic action as non-killing and disinfectant action as killing; the rest either say or imply that antiseptics may kill or else do not mention the question. (2) Stating that antiseptics destroy bacteria, 6. Of these, 2 are from surgeons, 1 is from a chemical dictionary which quotes alcohol and boric acid as examples, and 1 considers the "inhibiting" sense preferable. (3) Not giving a clear issue, or controversial, 10.

It should be remembered that whether a given substance is a germicide or an antiseptic, or neither, depends on several factors. One is the *strength* in which the agent is used; it may be a germicide in a solution of a certain concentration and only an inhibiting agent at a lower concentration. The *time of contact* and *mode of application* must also be taken into account; a solution which is germicidal when in contact with the material for 30 minutes may not be so for an exposure of 5 minutes, and imperfect contact of course lessens effectiveness. The *nature of the microorganism* must also be considered, since the resistance of different kinds varies greatly, so that a substance might be germicidal for one variety and only inhibitory

toward another, within a definite range of concentration. And there are still other factors, such as the *temperature*, the *abundance of the microorganisms* and the *nature of the material* in which the microorganisms are found.

#### DISINFECT, -TANT, -TION

##### *Definitions—*

*disinfectant, n.* An agent that frees from infection; usually, a chemical agent which destroys disease germs or other harmful microorganisms (but not, ordinarily, bacterial spores); commonly used of substances applied to inanimate objects.

*disinfectant, adj.* Freeing from infection, especially by destroying disease germs or other harmful microorganisms.

*disinfect, v.t.* To free from infection, especially by destroying disease germs or other harmful microorganisms.

*disinfection, n.* The act or process of disinfecting.

*Comments—*The verb *disinfect* first appears in the literature at about the beginning of the 17th century, and the other forms much later. Like *antiseptic*, this group of words came into use before the germ theory of disease originated. It was believed that certain "effluvia" existed in the air and on furniture, clothing, etc., and communicated certain diseases; hence, the infection must either be removed or destroyed. It is now recognized that the infection is caused by microorganisms, but we continue to use *disinfectant* as a convenient term for any agent that accomplishes the result of freeing from infection.

Wilcox (*Pharmacology and Therapeutics*, ed. 7, p. 13) states that "the term *disinfectant*, by extension, is applied to those agents which kill non-pathogenic bacteria, as well as to those which destroy disease germs." This, it seems, involves an extension of the meaning of the word "disinfection" to include freeing from other undesirable microorganisms besides those causing human disease.

*Disinfectant and Germicide—*For some time after the advent of the germ theory of disease, authors hesitated to describe the action of a disinfectant as being wholly or principally the destruction of microorganisms. They spoke of "restraining" or "neutralizing" the germs, of destroying the poisons produced, of deodorizing, etc. It would seem that their idea of "ridding of infection" was clear but not the precise method by which disinfectants operate. Popularly this vagueness persisted much longer. Albert Buck (*Reference Handbook of the Medical Sciences*, 1894) says: "Popularly, the term *disinfection* is used in a much broader sense. Any chemical agent which destroys or masks bad odors, or which arrests putrefactive decomposition, is spoken of as a *disinfectant* . . . This popular use of the term has led to much misapprehension." This misapprehension seems to have decreased with the spread of scientific knowledge.

Of 143 definitions of "disinfectants," dating from 1854 to 1930, 25 (chiefly of earlier dates) make no reference to microorganisms. Of the remainder, 95 define disinfectants as germ destroyers, 9 state that they may also act by removing the germs, and 8 say that they either destroy germs or arrest their action. Of the 95 citations, 52 define disinfectants as destroyers of *disease* germs, 34 merely say that they destroy germs or are germicides, while 9 specifically state that they destroy all germs, non-pathogenic as well as pathogenic.

Hence it seems to be generally expected that any substance used as a disinfectant will destroy the cause of infection, that is, will act as a germicide.

The word *disinfectant* still carries with it much of its original connotation. It suggests the cleaning of sick rooms, clothing, bedding, lavatories, stables and in

fact of any places or things that might harbor disease. By contrast, *germicide* is a precise, colorless word, conveying its literal meaning and little more. Aside from their history and connotations, however, *disinfectant* and *germicide* appear today to have the same meaning when applied to substances used in fighting disease.

*Disinfectant and Antiseptic*—If we accept certain conclusions from the above discussion, namely, that the substances called disinfectants are germicides, and also that in general germicides may act as antiseptics but that antiseptics are not necessarily germicides, then it follows that disinfectants may (theoretically at least) act as antiseptics, but that antiseptics may not necessarily act as disinfectants. Due attention should of course be paid to the different connections in which the two words are used.

#### STERILIZE, -ZATION

##### *Definitions—*

*sterilize, v.t.* To render sterile, that is, free from all living microorganisms.

*sterilization, n.* The act or process of sterilizing, or freeing from all living microorganisms.

*Comments*—These are exact terms, which came into use (in the sense under discussion) to express a precise idea, namely the freeing of a material, container, or space from living microorganisms of all kinds. There is no distinction between disease germs and other germs, or between resistant and nonresistant varieties or forms. If a thing has been treated in such a way that no growths can be produced from it by appropriate culture, then—and then only—has it been completely *sterilized*.

One of the best ways to accomplish sterilization is maintaining for a sufficient time at a temperature at which microorganisms cannot live; hence the use of the word *sterilize* suggests to some the destruction of microorganisms by *heating*. To others it includes also the notion of the use of strong chemical agents. The word calls to mind the treatment of surgeons' instruments, gauze bandages, culture dishes, and other apparatus rather than the treatment of the sick room or of the human body.

*Disinfect and Sterilize*—It has been noted that *disinfect* refers particularly to the destruction of disease germs (especially the vegetative forms), while *sterilize* denotes the freeing from all organic life. Hence *sterilize* is the more drastic of the two terms and it might easily happen that something is thoroughly disinfected without being completely sterilized. This is true, for example, of the customary treatment of milk cans, milk bottles, etc., in the dairy industry, where treatment sufficient to prevent diseases and spoiling of the milk is not necessarily sterilization.

#### DEODORANT, -RIZER

##### *Definition—*

*deodorant, deodorizer, n.* Anything that destroys or masks offensive odors.

*Comments*—A deodorant may or may not be an antiseptic or disinfectant. The popular notion that danger from infection disappears with the removal of disagreeable odor is of course a mistaken one.

#### INSECTICIDE, -DAL

##### *Definitions—*

*insecticide, n.* A substance that destroys insects, especially a preparation used for this purpose.

*insecticidal, adj.* Of or pertaining to insecticides; destroying insects.

*Comments*—As defined, the word *insecticide* is limited to the destruction of in-

sects. The Insecticide Act of 1910 defines it somewhat more broadly, however, as "any substance or mixture of substances intended to be used for preventing, destroying, repelling, or mitigating any insects." Also, the Food and Drug Administration admits within the term *insect* small invertebrate animals such as spiders and mites which do not belong to the order Insecta but are liable to be called insects in popular language. Insecticides may be effective against one type of insect but not necessarily against all types of insects. Insecticides usually act as stomachic or respiratory poisons; their method of application or use varies with the type of the insecticide and of the insect against which it is applied. An insecticide although usually used to destroy insects does not necessarily give a 100 per cent kill.

#### DISINFEST

##### *Definition—*

*disinfest, v.t.* To rid of infestation; to free from infesting insects, rodents or other small animals.

*Comments—*The earliest appearance of the word of which the committee has record is in the report of the Committee on Standard Regulations for the Control of Communicable Diseases, A. P. H. A., 1926, in which the following definition appears: "By disinfecting is meant any process, such as the use of dry or moist heat, gaseous agents, poisoned food, trapping, etc., by which insects and animals known to be capable of conveying or transmitting infection may be destroyed."

Since a word covering the above process was apparently needed, and since the inclusion of this sense in the meaning of *disinfect* (as has been the practice of some) seems incorrect and undesirable, the introduction and use of the comparatively new word *disinfest* are to be commended.

#### PROPHYLACTIC

##### *Definitions—*

*prophylactic, n.* Anything that prevents, or that contributes to the prevention of, disease; a preventive.

*prophylactic, adj.* Guarding from disease; preventing, or contributing to the prevention of, disease.

*Comments—*The meaning of *prophylactic* is wide. It applies to anything which even helps to ward off disease, as fresh air, nutritious diet, and rest, which serve as preventives of tuberculosis and other ailments. One writer has even used the term "mental prophylactics." Various medicinal preparations are also called prophylactics. It would seem however that a substance, to be called a prophylactic against a given disease, should be demonstrated to have some efficacy for the purpose in question under the conditions of its intended use.

#### CONCLUSION

It has been announced as a principle of legal practice that "language used in the label is to be given the meaning ordinarily conveyed by it to those to whom it is addressed." This commends itself as a sound and wise ruling, for the general public cannot be expected to be acquainted with special technical meanings or to have information proper to experts alone. Nevertheless, it is possible to draw wrong conclusions from this principle. People constantly make use of words of which they do not know the accurate meaning. They know barely

enough about it for ordinary purposes; the rest they leave to the specialist. This is eminently true of such things as drugs and medicaments. It is small wonder that similar terms are sometimes confused in the popular mind:

It may of course happen in the development of language that a term becomes so confused that it undergoes a complete change of meaning and that the new meaning becomes commonly accepted. But the mere fact that the average person has a confused notion of a word which is used correctly by writers and careful speakers does not justify acceptance of the confused meaning.

The terms *antiseptic* and *disinfectant* may be taken as examples. There appears to be some haziness in the mind of the public regarding their signification; yet the greater part of the literature is in fair agreement as to the derivation, history, and present meaning of the two words. Moreover, what popular confusion may exist is not so much with respect to the *root idea* of the words ("antiseptic," opposing decomposition; "disinfectant," ridding of infection) as regarding the mechanism by which the result is effected (removing germs, killing germs, or preventing the growth of germs). It is the result that chiefly concerns the public; the expert must be relied on for exact knowledge of the mechanism.

So far as the writer can determine after talking with various persons, bacteriologists, physicians, druggists, manufacturers of chemicals, and government officials, there do not seem to be serious differences of opinion among professional men as to the meanings of the various terms now under discussion.

In so far as differences exist, they seem to relate rather to the question as to what is a fair use of the terms in connection with certain manufactured products, when the circumstances under which these products are to be used are duly considered. For example, there seems to be pretty general agreement that the term *antiseptic* (at least aside from surgery) may properly be applied to a substance which merely arrests the growth of microorganisms without killing them. There is apparently no question, for example, as to advertising a bandage impregnated with iodoform as an antiseptic dressing for wounds or as to calling iodoform or any similar agent an antiseptic when so used. The question seems to be whether a substance which is not a germicide but which acts as an antiseptic so long as it remains in contact with the area to be protected can fairly be called an antiseptic when its application is necessarily brief as in the case of a mouth wash, gargle or tooth paste. Again, the agreement on the meaning of the term *prophylactic* seems to be good. It is recognized as a very broad term.

Apparently the main question at issue, if there is one, is under what circumstances a given substance may fairly be claimed to have a prophylactic effect.

The adjustment of such questions as to what is fair under different circumstances seems to lie outside the province of defining meanings of words. It seems to be a matter of bacteriological and medical knowledge, a spirit of fair play, and good common sense. If the writer may hazard a suggestion, it would be that, since the correct application of certain terms of which *antiseptic* and *disinfectant* may serve as types depends on a number of factors (in the present case, strength, time of contact, type of organism, etc.), due regard should always be had to these factors as they occur, or are likely to occur, in actual practice.

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## Honor to Whom Honor Is Due

THE address of Stokes<sup>1</sup> has elicited an answer and brought out references which have been overlooked or forgotten by the majority of people of this age. The particular statement involved is that "Metchnikoff with Roux 'had accomplished the first successful transfer of syphilis to apes' in 1905." From these reports and the discussion<sup>2</sup> given of them, it seems certain that Edwin Klebs, whose name combined with that of Loeffler is so well known in connection with the discovery of the germ of diphtheria, had seen the spirocheta in the lesions of syphilis nearly 30 years before the discovery by Schaudinn, and had inoculated apes with the material, with the production of characteristic lesions.

The report by Klebs states "(1) that in syphilitic lesions there are regularly found spirillar organisms, slender motile rods 2 to 5 microns long, which seem to belong in Ehrenberg's botanical group of monads, and which Klebs names, because of their spirillar shape, 'helico-monads'; (2) cultures of these organisms are obtained on a special medium of isinglass jelly; (3) successful transfer of syphilis to animals was obtained only in apes (*Macacus*), very suggestive but not entirely conclusive results in the case of subcutaneous inoculation of culture material (July 8, 1875), entirely conclusive in the case of inoculation with freshly excised material from a human primary lesion (December 29, 1877)."

Dr. Klebs, a son of Edwin Klebs, recognizes that there is now no way to control the exactness of the findings reported, but states that Metchnikoff recognized that Klebs was the first to have seen the spirocheta and to have inoculated apes with syphilis. Further, Ghon made the statement that at the Pathological Institute at Prague the skull of the second ape inoculated was still preserved and showed characteristic lesions.—Arnold C. Klebs, *Discovery and Discoverers*, *Science*, Feb. 12, 1932, p. 191.

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1. *Science*, 74: 505-506.
2. *Science*, 75: 191-192.

# A Health Aspect of Frozen Vegetables\*

R. P. STRAKA AND LAWRENCE H. JAMES

*Food Research Division, Bureau of Chemistry and Soils, U. S. Department of Agriculture, Washington, D. C.*

THE commercial preservation of foods by freezing storage apparently began at Salem, Ore., about 20 years ago, when berries were first frozen in large containers for hotel and wholesale trade. Later, freezing was widely used for the preservation of fish. Large quantities of fish are now frozen and marketed in retail containers, facilitating handling and improving considerably the sanitary conditions.

In recent years the number of different foods preserved and marketed in a frozen condition has tremendously increased. At present, many fruits and some vegetables are being stored in this manner. Numerous difficulties have arisen in developing methods best suited to the freezing of these and similar products, and some are still unsolved. In the marketing and handling of frozen fruits and vegetables, one question is of paramount importance, not only from the standpoint of public health, but the future of the entire frozen-food industry. The possibility of botulinus poisoning resulting from the consumption of defrosted, improperly handled vegetables and fruits must be considered. Marketing such products through the small grocery store directly to the consumer increases considerably the importance of this factor.

As the preservation of foods by freezing is comparatively new, it has received very little attention from bacteriologists or public health workers. Because of the lack of information on the occurrence and importance of botulinus spores on frozen vegetables, an extensive investigation was undertaken to determine the survival of these microorganisms in such products and their possible production of toxin when the vegetables have been improperly handled after defrosting or when they are accidentally defrosted during storage or transportation.

As far as we are aware, the commercial freezing of vegetables has been confined to limited amounts of peas, spinach, and asparagus. Green peas, however, have been widely considered for preservation by this method. Moreover, of the vegetables commercially frozen, peas are believed to be the most susceptible to microbial decomposition, and

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they are known to support abundant growth of, and toxin production by *Clostridium botulinum*. For these reasons peas were selected for this investigation.

The investigation was divided into two parts: a study of the effect of freezing on *Cl. botulinum* spores, both as regards survival and toxicity, and the possibility of the development of botulinus toxin in peas which had been improperly handled after defrosting or when accidentally defrosted during storage or transportation. Neither study has been completed, but the latter is reported in part here.

#### CONDITIONS STUDIED

The samples were all packed, inoculated, and frozen in Seattle, Wash., which might be considered the center of the industry at present. The investigation included:

1. Three methods of preparing the peas: (all hand shelled)
  - a. Washed in cold water
  - b. Washed in cold water, then blanched in boiling water
  - c. Washed in cold water, then blanched in boiling brine
2. Four types of containers:
  - a. No. 2 plain tin cans (sanitary type)
  - b. Rectangular 1-lb. cardboard boxes (known as "Peters" containers)
  - c. Wide-mouthed 16-oz. commercial glass jars equipped with metal friction caps for sealing under a vacuum
  - d. 1-lb. cardboard monotubs (circular cardboard "tubs" with cardboard tops)
3. Three degrees of inoculation with *Cl. botulinum* spores:
  - a. No inoculation (controls)
  - b. Dilute inoculation (see text)
  - c. Concentrated inoculation (see text)
4. Two methods of packing:
  - a. With vacuum (tin and glass containers only)
  - b. Without vacuum
5. Four methods of defrosting:
  - a. Water bath at 43° C. and examined immediately
  - b. Icebox for 3½ days (½ day for defrosting, then 3 days storage)
  - c. Room temperature for 3½ days
  - d. Water bath at 43° C. until defrosted (2 hours), cooked in 2.5 per cent brine on open fire, then stored at room temperature for 3 days

Each test condition was selected because of some particular relationship it bears either to the handling of frozen peas or to the growth of *Cl. botulinum*. The four types of containers have all been recommended for commercial use in freezing vegetables. Further, the con-

ditions of anaerobiosis might be different in the various types of containers. Three methods of treating peas prior to packing have been recommended. The natural resistance of plant tissues to bacterial invasion is retained for some time after the product has been removed from the plant, but it is largely destroyed by hot water. Blanching, therefore, might exert considerable influence in the growth of botulinus in the defrosted peas. Blanching in hot brine was used to determine the inhibitive action of salt on these microorganisms.

The influence of large numbers of bacterial spores on the sterilization of food products has been well shown by Bigelow and Esty<sup>1</sup> and their coworkers in studies of the factors which influence thermal-death-time determinations. Whether or not a similar influence would occur in the freezing of large numbers of spores was not known; therefore, each series was prepared in triplicate. The first, not inoculated, served as controls; in the second each filled container was inoculated with less than 100 botulinus spores; and in the third with approximately 100,000,000 spores. The technic of inoculation is outlined later.

The importance of a vacuum in the possible growth of botulinus spores in such a product hardly needs explanation. Since *Cl. botulinum* is an anaerobe, the removal of air may materially aid growth. The vacuum packing was confined to the tin and glass containers.

The various methods of defrosting were planned to duplicate as far as possible conditions which might occur in the marketing and consumer handling of the product. Examination immediately after defrosting shows whether or not toxin has been formed while the product was frozen or was released from the spores by mechanical injury in freezing, and also serves as a control on the other treatments. Holding in the icebox for  $3\frac{1}{2}$  days may occur in the home. Approximately  $\frac{1}{2}$  day is required to defrost the product in a small ice refrigerator. Storage at room temperature for  $3\frac{1}{2}$  days allows something less than  $\frac{1}{2}$  day for defrosting and a storage period of about 3 days. The fourth method of treatment consisted in defrosting in a  $43^{\circ}$  C. water bath, boiling the peas in a 2.5 per cent brine for 10 minutes, then storing them in pint jars at room temperature for 3 days in order to determine the effect of cooking on the susceptibility of peas to the development of botulinus toxin.

Each test series of containers was assigned a number for later reference, which, with the conditions under investigation in each series, are given in Table I.

Under each test condition at least 16 containers were prepared. More than 1,000 containers were used, including 320 for tests on the influence of the length of storage in a frozen condition on the numbers

TABLE I  
SERIES NUMBERS USED IN PREPARATION OF THE SAMPLES

Conditions Tested		Inoculation	Types of Containers *			
			Mono-tubs	Peter's Type	Tin Cans	Glass Jars
Blanching	Washed cold water	None	1	10	19	28
		Dilute	2	11	20	29
		Concentrated	3	12	21	30
	Washed cold water, blanched hot water	None	4	13	22	31
		Dilute	5	14	23	32
		Concentrated	6	15	24	33
	Washed cold water, blanched hot brine	None	7	16	25	34
		Dilute	8	17	26	35
		Concentrated	9	18	27	36
Vacuum	With vacuum †	None			37	43
		Dilute			38	44
		Concentrated			39	45
	No vacuum †	None			40	46
		Dilute			41	47
		Concentrated			42	48

\* Sixteen containers prepared under each series number  
† Peas washed in cold water and blanched in hot water

of *Cl. botulinum* spores living. This latter section of the investigation has not been completed and will not be reported here.

TECHNIC OF INOCULATION AND PACKING

One of the greatest difficulties encountered in extensive investigations with the botulinus microorganisms is the possible variation in toxicity when the organisms are subcultured in mediums over extended periods of time. This was overcome by the preparation of sufficient dried spores to make all inoculations. As vegetables generally carry some soil contamination, they are usually washed in water and blanched before they are packed for freezing. In the soil, botulinus spores are in a more or less dry state, but if present on the peas, they become moistened during washing or blanching, and if they remain are probably frozen while wet. To duplicate these conditions as closely as possible, buffer suspensions of dried *Cl. botulinum* spores were used in the inoculations. The dried spores were prepared according to the following technic: \*

\* The dried spores were prepared by Elizabeth W. Sommer at the William Hooper Foundation for Medical Research in San Francisco, Calif.

1. Cultures were grown on casein-digest agar (pH 7.4) for 5-6 days at 37° C.
2. The growth was suspended in distilled water, centrifuged, and washed twice with distilled water, twice with alcohol and twice with ether.
3. The material was then dried *in vacuo*.
4. The total number of living spores and their heat resistance were determined.

Because cultural differences are important in investigations involving the botulinus microorganism, the following 4 strains were used in this study:

1. *Clostridium botulinum*, Type A, strain No. 19, isolated from asparagus which was held responsible for the botulism outbreak at Boise, Ida.
2. *Clostridium botulinum*, Type A, strain No. 62, isolated from a liver infarct of a cow at Redwater, Nev.
3. *Clostridium botulinum*, Type B, strain No. 174, isolated from Italian canned onions.
4. *Clostridium botulinum*, Type B, strain No. 186, isolated from canned ham.

A mixture containing equal amounts of dried spores of each of these strains was prepared, and for inoculation definite quantities weighed on an analytical balance were suspended in Sorenson's buffer solution of pH 6.9 (2) and suspended by shaking with glass beads. It was found desirable to add 2.0 c.c. of the suspension to each container. Each 2.0 c.c. was made to contain 1.0 mg. of dried spores, so that with the most concentrated inoculations, each container received approximately 100,000,000 spores.

The inoculations were made in Seattle, Wash., and all samples opened and examined in Washington, D. C. In preparing the suspensions the work was done in one room, and the raw materials, samples, and inoculations were handled in a distant room. All equipment and suspensions were either sterilized or soaked with a solution of mercuric chloride after each day's run. No materials except the stock supplies of dried spores were carried over from one day to the next.

The peas, shelled by hand, were purchased from a Japanese grower in the vicinity of Seattle who delivered the desired quantity to the laboratory daily. What influence this method of shelling had on the spore contamination is not known.

#### PROCEDURE

About 5 lb. of peas were placed in a covered wire basket and agitated vigorously in a tank of clean, cold water. By this procedure, a large part of the dirt was removed. After they had drained about 2 minutes, some were packed in the containers, and the rest blanched by immersing in boiling water. The cold peas lowered the temperature of the water about 10° C. The water resumed boiling in about

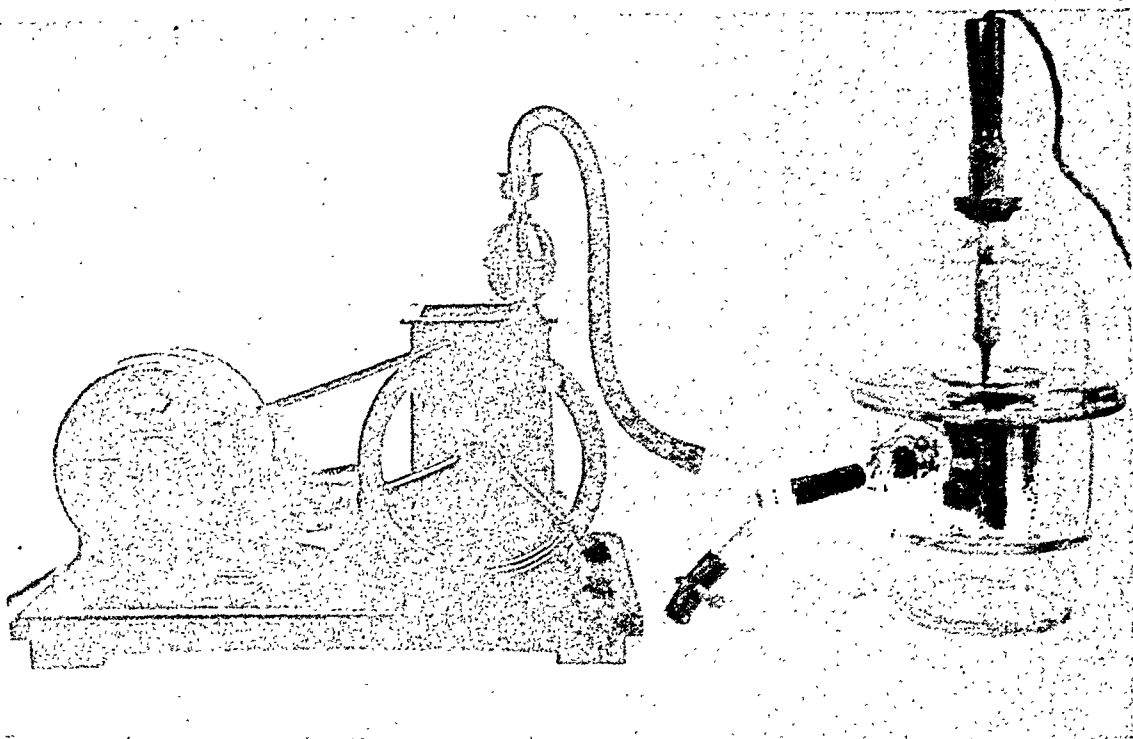


FIGURE I

APPARATUS USED IN SEALING TIN CONTAINERS UNDER A VACUUM

2 minutes and the peas were removed approximately 2 minutes later. After blanching, they were cooled and the containers filled.

The filled containers were inoculated immediately with 2.0 c.c. of the spore suspensions. Preliminary tests with eosin solution had shown that this amount of added liquid would give a reasonably uniform inoculation. The monotubs were closed by pressing into place the waxed cardboard tops. The "Peters" type boxes were closed, wrapped in moisture proof wax paper and tied with cord. In commercial practice the wax wrapper is generally sealed in place in order to make the container as moisture proof as possible. The tin cans were sealed on a hand sealing machine.\*

The containers which were to be packed under a vacuum were punctured through the lid with a small nail, then placed in a desiccator, through the top of which an electric soldering iron had been fitted by means of rubber tubing or a flexible cork stopper (Figure I).

A small piece of solder containing flux was placed beside the opening in the can lid, and the desiccator was closed. When a vacuum of 20 inches had been drawn, the hot iron was used to seal the hole, the vacuum released, and the can removed.

\* The authors are indebted to the Research Laboratories of the Continental Can Company for the method of sealing individual tin containers under a vacuum.

The glass jars were sealed by means of a vacuum sealing machine,\* although the vacuum was used in only a part of the containers.

After the containers had been closed they were put in storage as rapidly as possible, but as the cold storage was located at some distance, 5 hours elapsed before some reached the freezing room. They were placed on the floor of a storage room maintained at 10° F. and widely separated so as to allow as rapid freezing as possible. Each was frozen within a few hours. They were left in the freezing room until shipped.

Preparation and freezing of all the samples required 25 days. The period of storage in Seattle ranged from 7 to 25 days. Studies to be reported later have shown not only that the period of freezing storage does not influence the number of spores surviving, but also that different rates of freezing ("quick-freezing" or "slow-freezing") do not have different effects upon the spore population.

When all the samples had been frozen, they were packed in fiber cases, insulated with shredded paper, and sealed, then loaded into a pre-cooled refrigerator car, and packed on the floor immediately in front of the lower opening in the ice bunker. At Chicago, all samples were removed to a freezing storage room (0° F.) and held there for 24 hours. Although the samples were in good condition and possibly did not need additional freezing, the procedure was adopted as a precaution against defrosting. The cases were then packed into the end of a pre-cooled refrigerator car and shipped to Washington, D. C., where they were transferred immediately to a cold room, and stored at a temperature of approximately 18° F. until removed for examination.

#### EXAMINATION OF SAMPLES

The samples were defrosted according to 4 procedures. In defrosting those for immediate examination the tin containers, after removal from cold storage, were immersed at once in a water bath maintained at 43° C. The cardboard containers were placed in a pan which was lowered into the water, and the entire bath was covered. They required a slightly longer period for complete defrosting than did the tin containers.

Another series of containers was defrosted in an icebox and stored there for 3 days. The icebox was small and poorly insulated. The temperature of the food compartment varied somewhat, although the box was iced daily. At the end of the storage period the samples were examined as later described.

The containers defrosted at room temperature were left undisturbed on the laboratory table for 3½ days, during which most of the

---

\* Loaned by the Hazel-Atlas Glass Company.

tin containers swelled so much that puncturing was required, a very small hole being made in each lid. After  $3\frac{1}{2}$  days the samples were examined according to a regular laboratory procedure.

The peas which were to be cooked were defrosted in the  $43^{\circ}$  C. water bath; transferred to an open pan; 500 c.c. of 2.5 per cent salt solution was added; and the whole was boiled vigorously for 10 minutes. In this time practically all the liquor boiled away. This was made up to original volume; the peas and liquor were transferred to a sterile pint jar and allowed to cool. The lid was then loosely clamped on, and the jar stored at room temperature for 3 days. At the end of this time the examination was made as outlined below.

The samples for immediate examination were completely defrosted, and at the end of the storage period for those left at room temperature and in the icebox, the peas of each sample were transferred to a sterile pint jar. The original containers were washed out with 50 c.c. of sterile water, which was added to the pint jar. During most of this study the peas were then crushed with a sterile spoon. Each jar was shaken vigorously 50 times. The liquor was then removed and divided into several parts as indicated in Figure II. One portion was used for the determination of total anaerobic bacterial and spore counts and the isolation of *Cl. botulinum*, one for the determination of the pH, and one for toxicity tests. Another portion, together with each pint jar and its contents, was held in reserve in cold storage.\*

Total numbers of anaerobic bacteria as well as spores were determined on each sample by the dilution method. Beef-heart medium, sterilized by heating 3 times in flowing steam, with incubation periods between, was used. All tubes were tested before use by incubation for 5 to 7 days at  $37^{\circ}$  C., and rarely were non-sterile tubes found.

In making the spore counts, tubes of the liquor removed from the peas were first heated in boiling water for 10 minutes. After inoculation, the tubes of medium were stratified with autoclaved vaseline, and incubated for at least 3 weeks at  $37^{\circ}$  C. All series of tubes were run in duplicate. Two sets of results have been noted, (1) the greatest dilution at which gas was produced in the beef-heart medium; (2) the greatest dilution which showed growth resembling that produced by *Cl. botulinum*.

In studying samples which did not contain botulinus toxin an effort was made to identify *Cl. botulinum* in the anaerobic tubes prepared for spore determination. For this purpose the tubes representing the greatest dilution showing growth resembling that of *Cl. botulinum* were

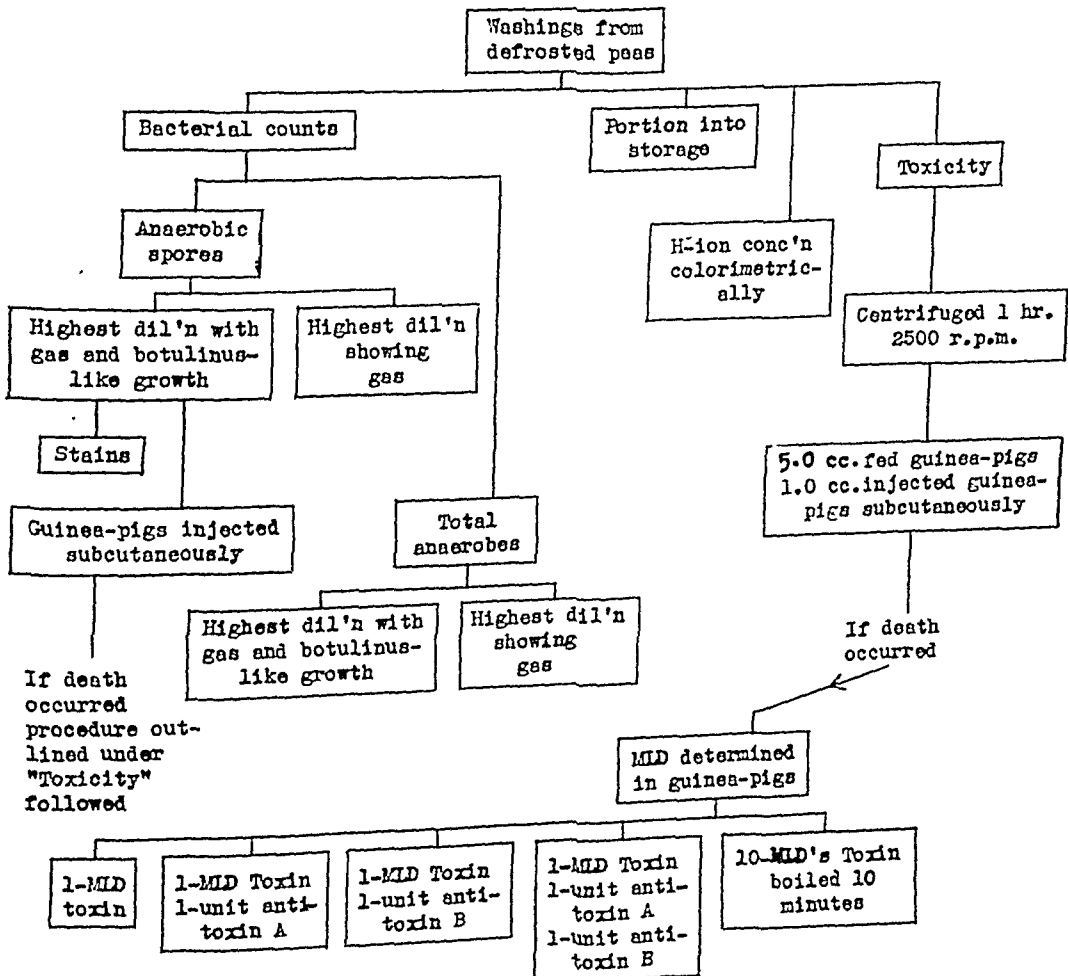
\* In the first part of the investigation the reserve portions of the samples were stored at  $34^{\circ}$  to  $36^{\circ}$  F., but later these and all subsequent portions were stored at  $18^{\circ}$  to  $20^{\circ}$  F.

used. The suspected cultures were injected subcutaneously into guinea pigs, and the culture was identified by neutralization of the toxin with antitoxin, according to standard procedures.

The pH of the various samples was determined colorimetrically, occasionally checked electrometrically.

Toxicity tests were made on the liquor removed from every container. The wash water was centrifuged at approximately 2,500 r.p.m. for 1 hour, which yielded a clear liquor satisfactory for feeding and injection. Guinea pigs have been used since preliminary comparisons of their reactivity with that of white mice indicated that much greater reliability could be placed upon the results with the former in this particular investigation. The centrifuged liquor of each sample was administered to 4 guinea pigs. Two were force fed, and 2 were injected subcutaneously. The fed pigs each received 5 c.c. per 250

FIGURE II  
LABORATORY EXAMINATION OF SAMPLES





gm. of body weight, the injected ones 1 c.c. per 250 gm. Proportionate dosages were used for pigs varying from the standard weight, but in no case was an animal used for forced feeding that required more than 5 c.c.

When the pigs showed no reaction the sample was rated negative for the presence of toxin. If illness or death occurred in at least 1 pig, further tests were made to determine whether or not it was caused by botulinus toxin, and if so to identify the type of culture responsible.

The centrifuged liquor and physiological salt dilutions thereof were injected subcutaneously into guinea pigs, 1 c.c. per 250 gm. of body weight. The smallest amount, that is, the highest dilution, causing death within 96 hours, was the m.l.d. for that particular sample. A final confirmatory series was run as follows:

1. One m.l.d. toxin
2. One m.l.d. toxin and 1 unit of antitoxin, Type A
3. One m.l.d. toxin and 1 unit of antitoxin, Type B
4. One m.l.d. toxin and 1 unit of antitoxin, Type A,  
and 1 unit of antitoxin, Type B
5. Ten m.l.d.'s toxin heated in boiling water for 10 minutes

Two pigs were used for each of these combinations. Sterile physiological salt solution was used as a dilution medium. The mixtures were adjusted so that 1 c.c. contained the proper dosage for 250 gm. of body weight. The toxin-antitoxin combinations were carefully mixed, and allowed to stand at room temperature for 1 hour before injection subcutaneously into guinea pigs. The findings are reported only when definite results were obtained within 96 hours. In no case were they considered positive until clear-cut results were obtained, and the identity of the toxin was proved.

## RESULTS

Before discussing the results in detail it should be emphasized that toxin was obtained only in the defrosted samples of peas that had been held at room temperature, and that all of these were definitely spoiled. No toxin was obtained from containers defrosted and examined immediately or from containers defrosted and held in an ordinary icebox.

The examinations of only the tin and the cardboard containers have been completed. The former were finished before the latter were studied.

## TIN CONTAINERS

Seventy-two tin containers of frozen peas were examined; 24 had received no inoculation, 24 the dilute inoculum, and 24 the concentrated. Each of these lots was subdivided so that samples were de-

frosted according to each of the 4 methods described. During storage 14 of the containers became toxic, including 2 controls, 4 that had received dilute inoculation, and 8 that had received heavy inoculation, and 8 of the uninoculated containers yielded *Cl. botulinum* cultures. The results are summarized in Table II.

TABLE II  
BOTULINUS TOXIN AND CULTURES FOUND IN PEAS IN TIN CONTAINERS

Total Containers	Inoculation	Tins Containing Botulinus Toxin			Tins Containing Botulinus Spores	
		Number	Per cent	Type of Toxin	Number	Per cent
24	None	2	8.3	2 Type B	10	41.6
24	Dilute	4	16.6	2 Type A 2 " B	12 *	50.0 *
24	Concentrated	8	33.3	2 Type A 6 " B	24 *	100.0 *
Total 72		Total 14	19.4	Total 4 Type A 10 " B	Total 46 *	63.8 *

\* Presumptive.

The cultures isolated from the containers receiving the dilute and concentrated inocula have not been identified or typed, since such information would add little to the results obtained. The isolation of *Cl. botulinum* spores (presumptive) from only a few more of the dilute-inoculated containers than from the uninoculated controls indicated that the "dilute" inoculum contained only a few botulinus spores per c.c. Dilution counts in beef medium had shown approximately 10 spores per c.c. of suspension.

The results when the various toxic containers are considered from the standpoint of the different methods of defrosting and storage are very interesting. The 72 containers referred to in Table II are classified in Table III according to their treatment following defrosting.

In Table III a striking contrast is revealed between the containers of peas defrosted and held under varying conditions. Particularly striking were the results on the peas which, after being boiled for 10 minutes, developed toxin at room temperature.

The tests for total anaerobic bacteria and total anaerobic spores showed that in almost all containers the total anaerobic cells far outnumbered the spores. The length of the period of holding at

TABLE III

NUMBER OF TOXIC TIN CONTAINERS OBTAINED UNDER EACH OF 4 METHODS OF DEFROSTING AND STORAGE

Total containers	Inoculation	Containers Defrosted by			
		Water bath at 110° F. Not held	Icebox held 3½ days	Room temperature held 3½ days	Water bath at 110° F. Brine cooked held Room temperature 3 days
24	None	0	0	0	2 (8.3%)
24	Dilute	0	0	0	4 (16.6%)
24	Concentrated	0	0	2 (8.3%)	6 (25%)
Totals 72		0	0	2 (2.7%)	12 (16.6%)

temperatures after defrosting, of course, influenced these counts. Table IV shows the results obtained on the uninoculated tin containers. The studies so far have not covered those blanched in brine. Duplicate containers for each test condition have been examined. The "Sample Numbers" are as given in Table I. Each container number has received a letter in accordance with the method of defrosting and storage, as follows:

- 1. Water bath ..... A and B
- 2. Icebox—3½ days ..... C and D
- 3. Room temperature—3½ days ..... E and F
- 4. Water bath—boiled—held room temperature .... G and H

The nature of the botulinus cultures isolated from the uninoculated tin containers is of interest to both the food technologist and bacteriologist. The survey of various soils made by Dubovsky and Meyer showed that botulinus spores are present in a large number of gardens. The isolation of botulinus spores then from a comparatively large number of the uninoculated containers is of exceptional interest. The relation of the methods of preparation and defrosting to the type of botulinus culture obtained is given in Table V. Of the 24 uninoculated containers examined, cultures were isolated from 6 in which the peas had not been blanched and had not become toxic, and 4 were from peas which had been blanched, 2 of which contained toxin. This is

TABLE IV

ANAEROBIC COUNTS, pH, AND *Cl. botulinum* IN UNINOCULATED TIN CONTAINERS DEFROSTED BY EACH OF 4 METHODS

Sample No.	Method of Defrosting	Method of Preparation	pH	Bacterial Counts		<i>Cl. botulinum</i> Demonstrated	
				Anaerobes	Anaerobic spores	Dilution	Culture Type
19	A & B	Washed cold water	6.8	100	100	1-10	A
19			6.8	100	10	1-10	A
22		Blanched hot water	—	0	0	—	—
22			—	0	0	—	—
37		Blanched hot water	6.6	10,000,000	0	—	—
37		Vacuum packed	6.2	10,000,000	10	—	—
19	C & D	Washed cold water	7.0	1,000	10	—	—
19			7.0	100	10	1-10	A
22		Blanched hot water	5.4	1,000,000,000	0	—	—
22			5.4	1,000,000	10	—	—
37		Blanched hot water	5.4	10,000,000	0	—	—
37		Vacuum packed	—	10,000,000	0	—	—
19	E & F	Washed cold water	5.4	1,000,000,000	0	1-10*	B
19			5.4	1,000,000,000	0	1-10*	A
22		Blanched hot water	5.4	1,000,000,000	10	—	—
22			5.4	100,000,000	10	1-10*	B
37		Blanched hot water	5.4	100,000,000	10,000,000	—	—
37		Vacuum packed	5.4	100,000,000	0	—	—
19	G & H	Washed cold water	—	10	0	—	—
19			—	10	10	1-10*	A
22		Blanched hot water	6.2	100,000	0	1-10*	B
22			6.2	1,000,000	1,000	1-1,000	B
37		Blanched hot water	6.6	10,000,000	10	1-1,000,000*	B
37		Vacuum packed	6.6	100,000	0	—	—

\* Demonstrated in anaerobic count tubes, not spore count.

TABLE V

TYPES OF *Cl. botulinum* CULTURES OBTAINED FROM UNINOCULATED TIN CONTAINERS DEFROSTED BY VARIOUS METHODS

Sample Number	Method of Preparation	Method of Defrosting	Botulinus Cultures	
			Type	Dilution Count
19A	Washed cold water	Water bath 110° F.	A	10
19B	" " "	" " "	A	10
19D	" " "	Icebox	A	10
19E	" " "	Room temp.	B	10
19F	" " "	" "	A	10
19H	" " "	Boiled brine, room temp. *	A	10
22F	Blanched hot water	Room temp.	B	10
22G	" " "	Boiled brine, room temp.	B	10 †
22H	" " "	" " " "	B ‡	
37G	Blanched—Vacuum packed	" " " "	B ‡	

\* See 5 c under "Conditions Studied."  
 † This culture was obtained from a tube in the anaerobic count series, not from the spore count series.  
 ‡ These cultures were identified by toxin in containers.

particularly interesting in view of the fact that in most of the containers which showed *toxin* the peas had been blanched.

It is also significant that half the cultures isolated from the uninoculated peas were Type A, and half (including those demonstrated by toxin production) Type B, while, as given in Table II, of the 14 containers showing toxin, 4 were Type A and 10 Type B.

A correlation can be seen between the types and strengths of the toxins and the methods of preparation and defrosting. Table VI shows such a correlation, including the findings with the inoculated materials. The predominance of Type B is striking.

CARDBOARD CONTAINERS

Results with peas packed in cardboard containers were interesting. There were only 48 of these, as none of this series was packed under a vacuum. The methods of preparation were exactly the same as used with the tin containers. Twelve per cent of the uninoculated cardboard containers became toxic. As in the tin containers, practically

TABLE VI

RELATION OF TYPE AND M.L.D. OF TOXINS IN TIN CONTAINERS TO INOCULATION AND METHODS OF PREPARATION AND DEFROSTING

Inoculation	Sample Number	Method of Preparation	Method of Defrosting	Toxin	
				Type	m.l.d.
None	22H	Blanch hot water	Cooked brine, room temp.*	B —	1,000
	37G	" " "	" " " "	B —	10
Dilute	23G	" " "	" " " "	B —	500
	23H	" " "	" " " "	B —	500
Concentrated	24G	" " "	" " " "	B —	1,000
	24H	" " "	" " " "	B —	1,000
	39G	" " "	" " " "	B —	1,000
	39H	" " "	" " " "	B —	100
	21G	Washed cold water	" " " "	B —	500
	21H	" " "	" " " "	B —	500
	21E	" " "	Room temp	A —	10
	21F	" " "	" "	A —	10
Dilute	20H	" " "	Cooked brine, room temp.	A —	100
	38G	Blanch hot water	" " " "	A —	1,000

\* See 5 c under "Conditions Studied."

$\frac{1}{3}$  of the toxins were produced by Type A cultures, and the rest by Type B. The results are summarized in Table VII.

Of the 16 uninoculated containers *Cl. botulinum* cultures were isolated from 3, and 2 became toxic. Thus, of 40 samples (in tin and

TABLE VII

BOTULINUS TOXIN AND CULTURES FOUND IN PEAS IN CARDBOARD BOXES

Total containers	Inoculation	Boxes Containing Botulinus Toxin			Boxes Containing Botulinus Spores	
		Number	Per cent	Type of Toxin	Number	Per cent
16	None	2	12.5	2 Type B	5	31.2
16	Dilute	2	12.5	2 Type A	9 *	56.2 *
16	Concentrated	5	31.2	1 Type A 4 " B	16 *	100.0 *
Totals 48		9	18.7	3 Type A 6 " B	30 *	62.5 *

\* Presumptive.

cardboard containers) which had received no artificial inoculation, *Cl. botulinum* cultures were isolated from, or demonstrated in, 15, or 37.5 per cent.

Four methods of defrosting were used, the same as with the tin containers. No toxin was produced when the containers were defrosted and examined immediately, or when they were defrosted in the icebox and stored there for 3 days. This was true even when the peas had received a heavy inoculation of botulinus spores. When the peas were defrosted at room temperature, and allowed to stand for 3 days, toxins developed in 2 out of 4 uninoculated containers, and in 7 of the 12 tested by this method. Of the 12 which were first cooked in brine and then stored at room temperature, only 2 became toxic. These 2 had received the concentrated inoculum. The results are summarized in Table VIII.

TABLE VIII

NUMBER OF TOXIC CARDBOARD CONTAINERS OBTAINED UNDER EACH OF 4 METHODS OF DEFROSTING AND STORAGE

Total containers	Inoculation	Containers Defrosted by			
		Water bath at 110° F. Not held	Icebox held 3½ days	Room temperature held 3½ days	Water bath at 110° F. Brine cooked held Room temperature 3 days
16	None	0	0	2 (12.5 %)	0
16	Dilute	0	0	2 (12.5 %)	0
16	Concentrated	0	0	3 (18.7 %)	2 (12.5 %)
Totals 48		0	0	7 (14.5 %)	2 (4.1 %)

Determinations of the number of anaerobic bacteria as well as anaerobic spores were also made on all the cardboard containers. The results, together with the pH, method of defrosting, and demonstration of the botulinus organisms, are given in Table IX. As indicated, wherever possible the isolation of botulinus microorganisms was made from the tubes prepared for the determination of the numbers of spores. In this series of uninoculated containers, however, no botulinus-like growth was observed in the spore tubes. Therefore trans-

fers were made from the other series of tubes (those for the total anaerobic counts) wherever such was indicated by the proper growth. Five isolations of *Cl. botulinum* were made, 3 Type A, and 2 Type B.

TABLE IX

ANAEROBIC COUNTS, pH AND *Cl. botulinum* IN UNINOCULATED CARDBOARD CONTAINERS DEFROSTED BY EACH OF 4 METHODS

Sample No.	Method of Defrosting	Method of Preparation	pH	Bacterial Counts		<i>Cl. botulinum</i> Demonstrated	
				Anaerobes	Anaerobic spores	Dilution	Culture Type
10	A and B	Washed cold water	6.4	1,000	0	—	—
10			6.6	0	0	—	—
13		Blanched hot water	6.8	100	0	—	—
13			6.8	100	0	1-10*	A
10	C and D	Washed cold water	6.2	100	0	—	—
10			4.8	1,000	0	—	—
13		Blanched hot water	6.0	10,000	0	—	—
13			6.5	10,000,000	0	—	—
10	E and F	Washed cold water	4.8	10	0	1-10*	A
10			6.0	10	0	1-10*	A
13		Blanched hot water	5.0	1,000,000	10,000	1-1,000,000*	B
13			5.0	100,000,000	100,000	1-1,000,000*	B
10	G and H	Washed cold water	6.2	0	0	—	—
10			6.2	0	0	—	—
13		Blanched hot water	6.0	10,000,000	100,000	—	—
13			5.8	100,000,000	0	—	—

\* Demonstrated in anaerobic count tubes, not spore count.

The connection between the types of botulinus cultures isolated and the methods of preparation and defrosting (Table X) is analogous to that noted in the tin container series, namely, that both A and B types occurred with about equal frequency, apparently independent of the method of defrosting and storage, but closely associated with blanching. The majority of Type A cultures were obtained from lots



which had only been washed in cold water, whereas most of the Type B were isolated from lots which had been washed in cold water and then blanched in hot water.

TABLE X

TYPES OF *Cl. botulinum* CULTURES OBTAINED FROM UNINOCULATED CARDBOARD CONTAINERS DEFROSTED BY VARIOUS METHODS

Sample Number	Method of Preparation	Method of Defrosting	Botulinus Cultures	
			Type	Dilution Count *
10E	Washed cold water	Room temperature	A	10
10F	" " "	" "	A	10
13B	Blanched hot water	Water bath 110° F.	A	10
13E	" " "	Room temperature	B	1,000,000
13F	" " "	" "	B	10

\* These cultures were obtained from tubes of anaerobic count series, not from spore count series.

The data on the types and strengths of toxins in the cardboard containers (including the inoculated and the uninoculated) reveal further interesting information. Nine of the 48 containers showed toxin, 6 Type B, and 3 Type A. All the Type B toxins were produced in peas which had been blanched. These results are shown in Table XI.

TABLE XI

RELATION OF TYPE AND M.L.D. OF TOXINS IN CARDBOARD CONTAINERS TO INOCULATION AND METHODS OF PREPARATION AND DEFROSTING

Inoculation	Sample Number	Method of Preparation	Method of Defrosting	Toxin	
				Type	m.l.d.
None	13E	Blanched hot water " " "	Room temperature " "	B	10
	13F			B	125
Concentrated	15E	" " " " " " " " " " " "	" " " " Cooked brine, room temp.* " " " "	B	500
	15F			B	100
	15G			B	100
	15H			B	500
	12E	Washed cold water	Room temperature	A	2
Dilute	14E	Blanched hot water " " "	" " " "	A	10
	14F			A	50

\* See 5c under "Conditions Studied."

One interesting difference appears between the 2 types of containers. Leaving out of consideration the peas packed under a vacuum, we find that the toxins developed in the cardboard boxes were a little less potent than those in the tin containers.

#### SUMMARY

1. Twelve hundred containers of peas were prepared and frozen in Seattle, Wash., shipped to Washington, D. C., for study. The investigation included 4 types of containers, 3 methods of preparation, 3 degrees of inoculation, 2 methods of packing, and 4 methods of defrosting.

2. The peas, before freezing, were inoculated with buffer suspensions of dried *Cl. botulinum* spores. A mixture of 4 strains of *Cl. botulinum* (2 Type A and 2 Type B) was used.

3. All the peas were frozen in a cold storage room at 10° F.

4. The following determinations were made on each container:

- a. Total anaerobic bacteria
- b. Total anaerobic bacterial spores
- c. Botulinus cultures isolated where possible from the uninoculated peas
- d. H-ion concentration
- e. Toxicity—Botulinus toxins, when present, identified in guinea pigs

5. Examination of 24 tin containers of uninoculated peas, most of which were held for 3 days after defrosting, showed 2 to be toxic. Eight others yielded botulinus cultures, 2 of which were obtained from samples examined immediately after being defrosted.

6. Examination of 24 tin containers of peas lightly inoculated, most of which were held for 3 days after defrosting, revealed that 4 were toxic.

7. Of 24 tin containers which had received a heavy inoculation, most of which had been held for 3 days after defrosting, 8 were toxic.

8. Of 16 cardboard containers which had received no inoculation and most of which had been held for 3 days after defrosting, 2 were toxic, and 3 others yielded botulinus cultures.

9. Of 16 cardboard containers which had received a light inoculation and most of which were held for 3 days after defrosting, 2 were toxic.

10. Of 16 cardboard containers which had received a heavy inoculation and most of which had been held for 3 days after defrosting, 5 contained toxin.

11. No toxin developed in peas which were examined immediately after defrosting, and none developed in those defrosted and held for 3 days in the icebox.

12. The contents of all the containers which showed toxin had been stored at room temperature and were badly spoiled when examined.

13. From the uninoculated peas (both types of containers) both Type A and Type B cultures of *Cl. botulinum* were isolated in approximately equal numbers, 8 Type A and 7 Type B.

14. Of the peas that were blanched and later became toxic (both types of containers), 3 showed Type A toxin whereas 14 showed Type B. Of the peas that became toxic after having been washed in cold water without blanching (both types of containers) 4 showed Type A toxin, and 2 Type B.

In the total of 23 toxic containers, 7 were Type A, and 16 Type B.

15. Of the total of 4 uninoculated samples which showed toxin, 2 were ob-

tained from the tin and 2 from the cardboard containers, and in both kinds of containers the peas had been blanched. The toxin in all 4 was Type B.

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#### ACKNOWLEDGMENTS

In planning this investigation and throughout the course of the work the authors have called freely upon the advice of others and gladly acknowledge their valuable assistance. Particular credit is due to Dr. K. F. Meyer, Dr. J. R. Esty, and Dr. F. C. Blanck for their advice and criticisms. The authors are very grateful to Elizabeth W. Sommer, at the William Hooper Foundation for Medical Research, San Francisco, for the preparation of the dried botulinus spores used in this study. The investigation was aided considerably by the donation of various containers by the Continental Can Company, Hazel-Atlas Glass Company, and General Foods, Inc., and by other assistance. Laboratory facilities for the preparation of the samples were provided by the Seattle Laboratory of the Food and Drug Administration. The samples were frozen and stored in Seattle by the Port of Seattle, the municipal dock refrigeration house, whose coöperation also was of considerable assistance.

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## Travels of Marco Polo

YARKAND is a province five days' journey in extent. The people follow the law of Mahommet, but there are also Nestorian and Jacobite Christians. They are subject to the same prince that I mentioned, the great Khan's nephew. They have plenty of everything, particularly of cotton. The inhabitants are also great craftsmen, but a large proportion of them have swollen legs, and great crops at the throat, which arises from some quality in their drinking water. As there is nothing else worth telling we may pass on."

In the prologue, it is related that the great knowledge and experience of "the world and its wonders" of the Polo brothers' travels of twenty-six years were reduced to writing as indicated by the following quotation:

"Now, being thereafter an inmate of the Prison at Genoa, he caused Messer Rusticiano of Pisa, who was in the said Prison likewise, to reduce the whole to writing; and this befell in the year 1298 from the birth of Jesus."

The travels by the Polo brothers (Marcus, Mofteo), sons of a nobleman from Venice, began from Constantinople in 1260, A.D.

This reference suggests the presence of some form of elephantiasis, and of goiter, with a definite diagnosis that the latter was due to the drinking water.—Grossett and Dunlap, New York. From *Universal Library*, p. 60, chapter 35.

# Identification of Certain Funguses Pathogenic for Man\*

W. D. STOVALL, F. A. P. H. A., AND ANNA BUBOLZ

*State Laboratory of Hygiene, Madison, Wis.*

**B**LASTOMYCOSIS as reported in this country and elsewhere is a disease associated with yeast-like funguses as etiological agents. The term blastomyces is used in a general way to include a multiplicity of organisms, yeast-like in certain stages of their life cycle and under certain conditions, variously described by different investigators as saccharomyces, cryptococcus, monilia, oidium, torula, endomyces and coccidioides. It appears that the term blastomycosis was first used by Busse and later by Gilchrist to designate a skin disease associated with a fungus the identity of which they were not certain.

Since the work of Robin, 1853, a yeast-like fungus has been recognized as the cause of thrush, and these organisms have been described as the cause of vaginitis, bronchitis and certain skin diseases. Primary pulmonary infections have not been frequently observed until recently. From the tropical countries Castellani, Sen, Paramanand and Pijper have reported cases of bronchitis, and in this country Boggs and Pincoffs, Simon, Steinfeld, Johns and Shaw have reported the isolation of yeast-like funguses from the sputum in cases of pneumonia, bronchitis, chronic bronchitis, and asthma. One of us (Stovall), 1928, reported 18 cases of primary infection of the lung with yeast-like fungus.

Concerning the identity of the organisms associated with these diseases there is considerable confusion. The reports indicate a wide variety of organisms which are so sensitive to environment as to defy certain identification. It has come to be believed that any one of these organisms may change its biochemical or cultural characteristics for no apparent reason. Thus it is not uncommon to find in the literature expressions like these: "Asci present but certain strains do not seem to be able to produce asci"; "the characteristics are very variable; some strains of this organism ferment saccharose and some do not." The reports as to the ability of certain of this group to coagulate milk or liquefy gelatin are also variable.

For the past 7 years we have been engaged in the study of the bio-

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\* Read before the Laboratory Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 14, 1931.

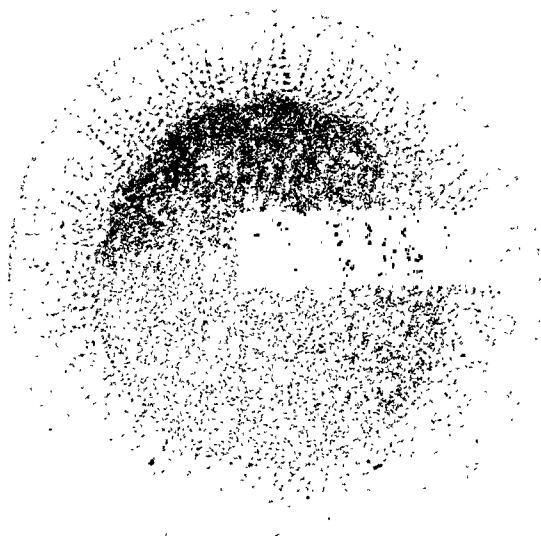


FIGURE I—Malt agar colony. Type I  
Monilia

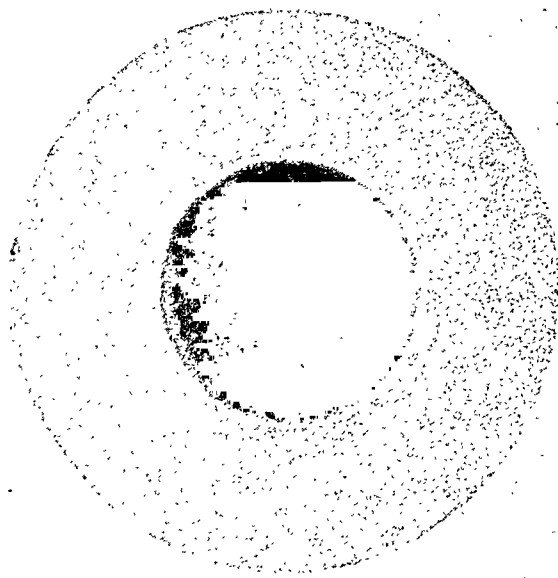


FIGURE II—Malt agar colony. Type II  
Monilia

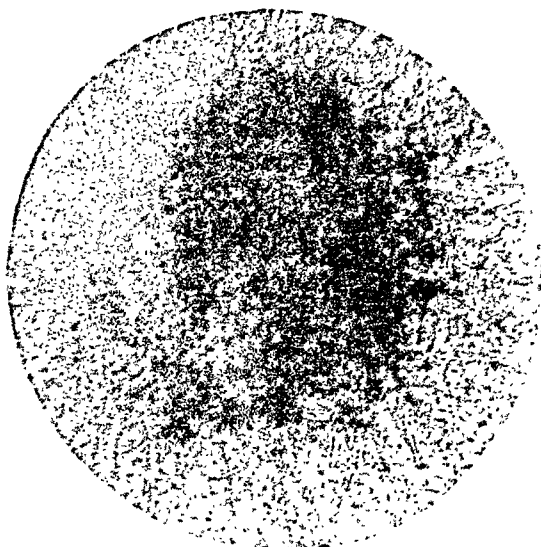


FIGURE III—Malt agar colony. Type III  
Monilia

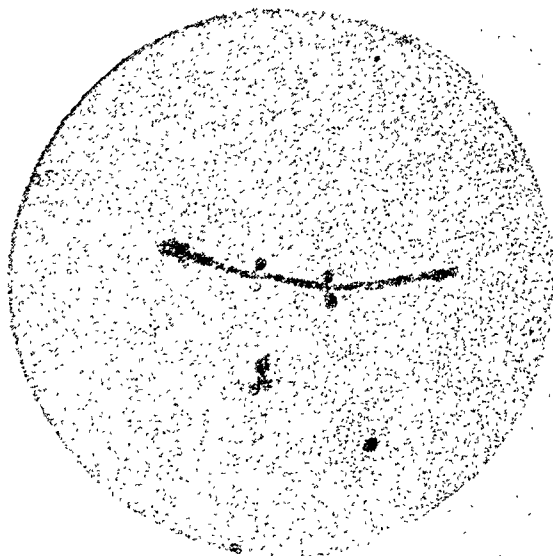


FIGURE IV—Monilia from culture

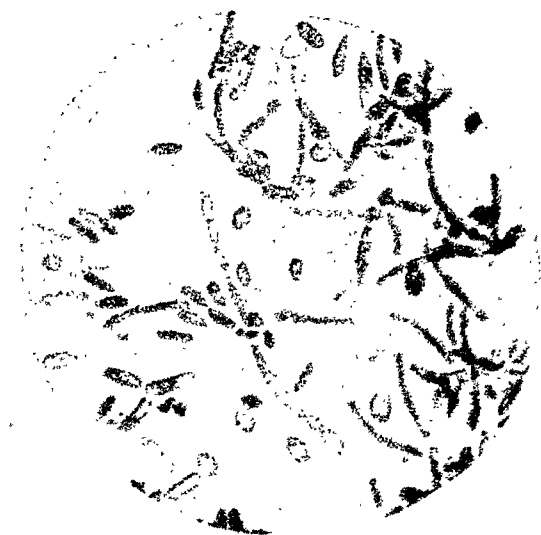


FIGURE V—Endomyces, culture showing asci

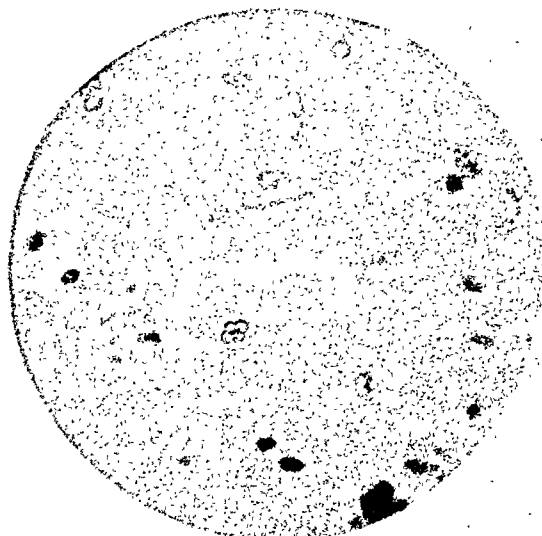


FIGURE VI—Saccharomyces, culture showing  
asci

TABLE I  
SHOWING CULTURAL AND BIOCHEMICAL CHARACTERISTICS OF FUNGUS

	Glucose	Levulose	Mannose	Maltose	Galactose	Sucrose	Lactose	Inulin	Raffinose	Dextrin	Gelatin	Milk	Mycelial Colonies Malt Agar 48 hours
Monilia Type I	AG	AG	AG	A	A	A	O	O	O	O	O	O	+
Monilia Type II	AG	AG	AG	AG	AG	A	O	O	O	O	O	C	O
Monilia Type III	AG	AG	AG	AG	AG	AG	O	O	O	O	O	O	++
Endomyces	AG	AG	AG	O	AG	AG	AG	AG	AG	O	+	A	+
Saccharomyces	AG	AG	AG	AG	AG	AG	O	O	AG	O	O	O	O
Oidia	O	O	O	O	O	O	O	O	O	O	+	O	+ 12 days
Torula	A	A	A	O	A	A	O	O	O	O	**	O	O

chemical and cultural behavior of yeast-like fungus isolated from sputum in cases of pneumonia, bronchitis, asthma, and from cases of vaginitis, thrush, skin lesions and generalized infections. In 1929 we reported on 40 strains, and since have completed a study of over 200 cultures isolated by us and others obtained from the American Type Culture Collection. The methods employed have been described elsewhere.

Table I shows the result of the study of the 200 cultures isolated by us. The sugars used are indicated in the table. The results of the fermentation tests were read after incubation at 37° C. for 7 days. The colonies were described and illustrated (Figures I, II and III) at the end of 48 hours at 37° C.

The same malt agar plates used for the study of colony morphology were used to demonstrate the formation of asci. After the morphology of the colony had been observed at the end of 48 hours at 37° C., the plates were allowed to stand in the icebox or at room temperature until dry and hard—from 30 to 60 days. The dried growth was soaked off with sterile salt solution and again plated on malt agar and incubated at 37° C. Numerous asci could be demonstrated after 3 days.

Table II gives a description of the organisms secured from the American Type Culture Collection. Two of the monilia, *M. Albicans* and *M. Candida*, have been the subjects of controversy for a long time, and their characteristics variously described by different investigators.

TABLE II

SHOWING OUR IDENTITY OF ORGANISMS  
Secured from American Type Culture Collection

	Glucose	Levulose	Mannose	Maltose	Galactose	Saccharose	Lactose	Inulin	Raffinose	Dextrin	Mycelial Colonies Malt Agar 48 hours	Gelatin	Milk
Type I Monilia													
Monilia Type I	AG	AG	AG	A	A	A	O	O	O	O	+	O	O
Type II Monilia													
Monilia Type II	AG	AG	AG	AG	AG	A	O	O	O	O	O	O	C
212 <i>M. albicans</i> Craik	AG	AG	AG	AG	AG	A	O	O	O	O	O	O	C
801 <i>M. richmondi</i> Shaw	AG	AG	AG	AG	AG	A	O	O	O	O	O	O	C
2117 <i>M. pusillus</i> Ashfordi	AG	AG	AG	AG	AG	A	O	O	O	O	O	O	C
752 <i>M. pinoyi</i> Castellani	AG	AG	AG	AG	AG	A	O	O	O	O	O	O	C
753 <i>M. metalondinensis</i> Cast.	AG	AG	AG	AG	AG	A	O	O	O	O	O	O	C
4021 <i>Monilia-Zillig</i>	AG	AG	AG	AG	AG	A	O	O	O	O	O	O	C
4135 <i>M. pseudotropicalis</i> Castellani	AG	AG	AG	AG	AG	A	O	O	O	O	O	O	C
Type III Monilia													
Monilia Type III	AG	AG	AG	AG	AG	AG	O	O	O	O	++	O	O
2113 <i>M. candida</i> Bonorden	AG	AG	AG	AG	AG	AG	O	O	O	O	++	O	O
1369 <i>M. candida</i> Bonorden	AG	AG	AG	AG	AG	AG	O	O	O	O	++	O	O
750 <i>M. tropicalis</i> Castellani	AG	AG	AG	AG	AG	AG	O	O	O	O	++	O	O
Endomycet.													
748 <i>M. macedoniensis</i> Castellani	AG	AG	AG	O	AG	AG	O	AG	AG	O	+	O	O
Mycoderma													
749 <i>M. fructi</i> Castellani	AG <sup>P</sup>	AG <sup>P</sup>	AG <sup>P</sup>	O	O	O	O	O	O	O	+	O	O

A == Acid, G == Gas, O == negative results, + == positive, C == Clot, P == Pellicle.

We secured organisms furnished by two of the most recent investigators, Castellani and Ashford. *M. Richmondi* Shaw and monilia from

Sprue-Zillig were added to give a wide variation of location and opinion by which to test our method of classification.

We have found monilia associated with lesions of mouth, thrush; vagina, vaginitis; and lung, bronchitis, bronchiectasis, asthma and pneumonia. We have encountered them much more frequently than any other organisms. One hundred and fifty of the 200 cultures isolated are some variety of monilia. They are separated from other mycelium producing yeast-like funguses by the size of the cells and mycelium, by the absence of asci and by their method of reproduction—budding and mycelium production. The mycelium is septate and lateral conidia form by budding near the joints of the hyphae, and terminal conidia by budding and constriction at the ends of the hyphae (Figure IV). They also ferment a variety of sugars.

The species within the genus are recognized by colony morphology after incubation for 48 hours on malt agar, by the fermentation of sugars and reaction in milk. Table III shows the different species of monilia which have occurred in our cultures. Instead of recognizing a large variety of species we have been able to classify all the cultures isolated as one or another of 3 species. This is in contrast to previous investigators, who, if they have worked with a large number of cultures, have described many different species in this genus. This multiplicity of species has often been attributed to the variability of the organism under apparently identical conditions. We have not found this to be true. Our cultures have maintained the same reactions after repeated observation over a period of 7 years. When variations have occurred a restudy or checking has revealed an error in technic.

Because our results have shown only 3 different species of monilia and because these results have been so constant, we have studied the organism obtained from the American Type Culture Collection described in Table II. This table indicates that all of these cultures are either one of 3 types of monilia, or because of fundamental biological differences belong to another genus of yeast-like fungus. An instance

TABLE III  
SHOWING DIFFERENTIAL CHARACTERISTICS FOR THREE TYPES OF MONILIA

Species	Maltose	Saccharose	Milk	Mycelial Colonies
Type I	A	A	O	+
Type II ( <i>M. albicans</i> )	AG	A	C	O
Type III ( <i>M. candida</i> )	AG	AG	O	++



of this is *M. Krusei*. This organism is not a monilia but a mycoderma, because of the constant production of a pellicle when grown in the sugar mediums which it ferments. *M. Macedoniensis* Castellani has also been removed from the monilia group and placed in the class of endomyces by us, because asci have been observed repeatedly in this culture. *M. psilosis* Ashford as shown in the table gives constantly the reactions which we consider characteristic of *M. albicans*. Ashford has expressed the opinion that *M. psilosis* represents a single species and that it can be differentiated from *M. albicans*. He admits, however, that while all of his strains ferment maltose, there is a variability in their fermentation of saccharose. This we believe is evidence that *M. psilosis* represents a multiplicity of species, and that in the one instance when saccharose was fermented Ashford was dealing with *M. candida*, and in the other, saccharose not fermented, with *M. albicans*.

The differences between the 3 species of monilia which we have described is still further illustrated in Table IV. Nearly all investigators have described a variety of reactions for these organisms when grown in litmus milk, and some a variability in the same organism. However, a review of the literature shows a striking lack of uniformity in the technic. The length of incubation has varied and no attention has been paid to the reaction of the milk or the constancy of the calcium lactate content. It is well known that various specimens of milk vary in their pH and that autoclaving precipitates the calcium lactate. After this salt has been precipitated the milk cannot be coagulated by rennet and the degree of precipitation slows up the coagulating time of rennet. The failure to take these factors into consideration can explain the variability of these organisms, when grown in litmus milk, reported by many investigators.

In order to substantiate this point of view, we carried out experiments illustrated in Table IV. Skimmed milk tubed in 10 c.c. quantities was sterilized in the Arnold sterilizer at 100° C. for 30 minutes on 3 successive days. To one set of tubes 0.5 c.c. of 10 per cent sterile calcium lactate was added, pH 6.4; another was used as plain milk, pH 6.6; and a third to which NaOH was added to bring it to pH 7.0. The different sets of tubes were inoculated with 0.1 c.c. of a 48-hour glucose broth culture from cultures representative of the 3 species of monilia. This experiment was carried out with all cultures of the different species and with those obtained from the American Type Culture Collection. Table IV shows the reactions constantly observed over many months and in many tests. Whereas we had before experienced the difficulties of other investigators—variability of the reactions of these organisms when grown in litmus milk—we were now always

TABLE IV  
SHOWING MILK REACTIONS OF MONILIA

Number and Name of Culture	Skimmed milk with 0.5 cc. 10% ca. lactate pH 6.4		Plain skimmed milk pH 6.6		Skimmed milk with NaOH pH 7.0	
	Coag. Time	pH at Coag.	Coag. Time	pH at Coag.	Coag. Time	pH at Coag.
Monilia Type I						
Monilia Type I	neg.	6.8	neg.	7.0	neg.	7.2
Monilia Type II						
Monilia Type II	3 da.	6.4	13 da.	6.8	neg.	7.0
2112 <i>M. albicans</i>	3 da.	6.4	12 da.	6.8	neg.	7.2
801 <i>M. Richmondii</i> Shaw	3 da.	6.4	13 da.	6.8	neg.	7.2
2117 <i>M. psilosis</i>	3 da.	6.4	10 da.	6.8	neg.	7.2
752 <i>M. pinoyi</i> Cast.	3 da.	6.4	12 da.	6.8	neg.	7.0
753 <i>M. metalondinensis</i> Cast.	3 da.	6.4	17 da.	6.8	neg.	7.2
4021 Monilia from Sprue-Zillig	3 da.	6.4	10 da.	6.6	neg.	7.2
4135 <i>M. pseudotropicalis</i> Cast.	3 da.	6.4	12 da.	6.8	neg.	7.0
Monilia Type III						
Monilia Type III	neg.	7.6	neg.	7.8	neg.	7.8
2113 <i>M. candida</i> Bon.	neg.	7.6	neg.	7.8	neg.	7.8
1369 <i>M. candida</i> Bon.	neg.	7.6	neg.	7.6	neg.	7.6
750 <i>M. tropicalis</i> Cast.	neg.	7.4	neg.	7.8	neg.	7.8

able to secure the same results and at an almost fixed incubation period. The reaction of the milk at the time of coagulation was determined by removing a small amount from the tube at the time of coagulation, or at the end of 3 weeks' incubation at 37° C., if coagulation had not taken place up to that time. This table shows that organisms in the same species behaved alike, and that the reaction and calcium lactate content corrected the variable results before observed.

The other organisms described in Table I we have not studied so

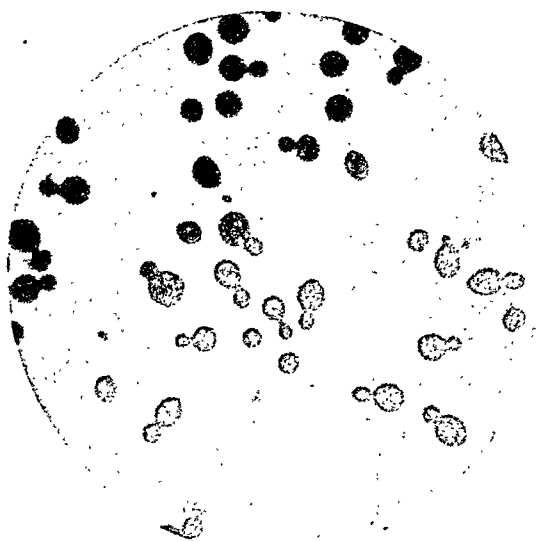


FIGURE VII—Torula—Culture

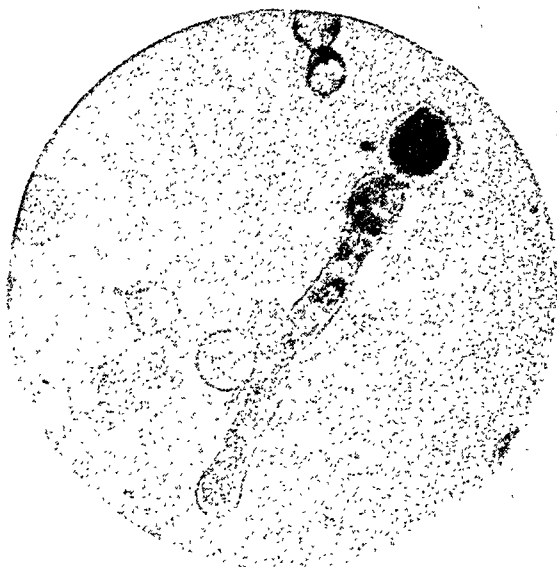


FIGURE VIII—Oidium—Culture

intensively. The figures in the plates illustrate the morphological differences of the various organisms. It will be observed that the endomyces is like monilia except that the former produces asci. The torula is similar to *saccharomyces cerevisiae* except that the latter produces asci and the former does not. The cultures of torula will produce abundant mycelium in sugar broth when left at room temperature 3 or 4 months. This is further evidence that uniformity of technic is an important factor in classifying these organisms.

The oidium described in Table I has the same morphological, cultural, and biochemical characteristics as the culture of *Oidium asteroides* Castellani, and the organism reported on by Gilchrist. Figure VIII shows the morphological differences between this organism and the others shown in the same plate. It has much coarser mycelium and a much larger spore with a double contoured wall. It does not ferment any sugar and in tissue never produces mycelium, but spores which are often seen in the giant cells (Figure IX). We have always isolated it from either skin lesions or sputum in cases suffering from a disease similar to that described by Gilchrist. It is our opinion that this is the organism

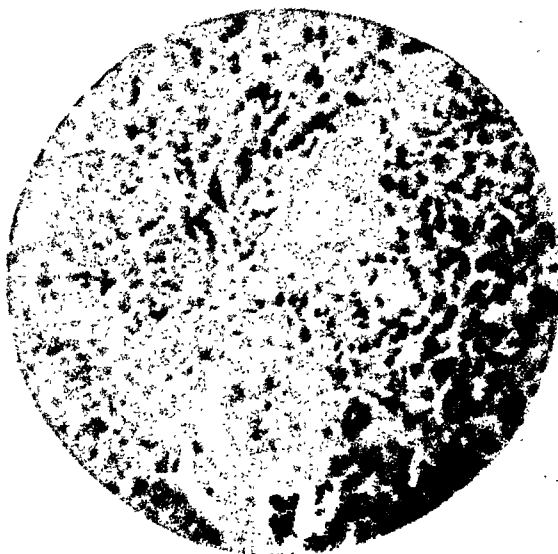


FIGURE IX—Oidium—In tissue, showing giant cell

which causes the typical blástomycosis described by Gilchrist, and that if the term blastomyces is to be used it should apply specifically to this organism.

#### SUMMARY

In our study of over 200 cultures of yeast-like funguses isolated from cases of thrush, bronchitis, asthma, pneumonia, vaginitis, and generalized infections we have encountered oidia (blastomyces), endomyces, torula, mycoderma and monilia. Of this group we have most frequently encountered monilia—150 out of 200 cultures. Our studies of these cultures and of cultures obtained from the American Type Culture Collection lead us to believe that probably there are only 3 species in this genus, 1 that does not ferment maltose, and 2 that do. Of the latter there are 2 varieties: 1 does not ferment saccharose, a type culture of which is *M. albicans*; the other ferments saccharose and is typified by *M. candida*. We have found the 3 species associated with thrush, vaginitis, bronchitis, etc. The characteristics of these organisms are constant when observed under identical environmental conditions and at stated periods of incubation. We believe that the reported variability of these organisms is due to a lack of uniformity in the technic of the investigators and not to the fickleness of the organisms.

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# Monilias, Yeasts, and Cryptococci\*

## Their Pathogenicity, Classification, and Identification

RHODA W. BENHAM, PH. D.

*Laboratory for Medical Mycology, Department of Dermatology, College of Physicians and Surgeons, Columbia University, New York, N. Y.*

SIMPLE fungi reproducing by budding and apparently related to the yeasts have been found with regularity in thrush and tropical sprue, in cases of bronchitis, meningitis, and in a variety of lesions of the skin and its appendages. Similar forms also grow saprophytically on the skin and in the intestines.

In a previous study<sup>1</sup> of such yeast-like forms from thrush, sprue, and skin lesions it was found that certain simple morphological characteristics could be relied upon for grouping them. This morphological grouping could be confirmed by the agglutination method.

### TYPES OF YEAST-LIKE ORGANISMS PARASITIC ON MAN

Most of the strains isolated from a series of cultures which now number several hundred can be classified under 8 types. Strains from oral thrush, intestinal sprue, and from moniliasis of the skin have appeared identical. This type will be referred to as *Monilia albicans*. Three other apparently distinct species of moniliae occur. One species of *Saccharomyces* and one of *Willia* have been found. In addition, strains are found which have been placed in the genera *Cryptococcus* or *Mycoderma*. These strains evidently include several species within each of these genera but no attempt has yet been made to differentiate them.

These types may be defined as follows:

*Monilia albicans* (Robin) Zoph.: Produces a definite mycelium made up of elongated cells which do not readily fall apart; reproduces by buds which accumulate in dense ball-like clusters along the mycelial threads. Globular thick walled chlamydospores are formed, no ascospores. An "inverted pine tree" forms in a gelatin stab. Ferments regularly dextrose, levulose, and maltose with the production of acid and gas. Varies in the reaction on galactose and saccharose. Giant colony, smooth and pasty at first, later convoluted at center, often showing small craters of ruptured gas bubbles. Agglutinates readily in serum produced against a known strain of *Monilia albicans*. Some cross-agglutination with other species,

\*Abstract of paper read before the Laboratory Section of the American Public Health Association at the Second Annual Meeting at Montreal, Canada, September 14, 1931.

but readily separated from these by agglutinin absorption. Agglutinates to full titer in serum prepared against *Monilia candida*. Absorption not yet determined. Pathogenic for rabbits.

*Monilia candida* (Hansen): Similar in morphology to *Monilia albicans* but lacks the characteristic chlamydospores and spore clusters. Produces an atypical "pine tree" in gelatin. Ferments with the production of acid and gas, dextrose, levulose, maltose, and saccharose. Giant colony, membranous and more deeply convoluted than *Monilia albicans*. Cross-agglutinates to the complete titer with albicans serum. Absorption not yet determined. Non-pathogenic for rabbits.

*Monilia parapsilosis* (Ashford): Mycelium more fragile. No chlamydospores, no ascospores. Reproduces by budding. No spore clusters. Forms brush-like structure in gelatin. Ferments dextrose and levulose with the production of acid and gas, saccharose and galactose with the production of acid. Giant colony, pasty, surface smooth or wrinkled or honeycombed. Slight agglutination with albicans serum but separated by absorption. Non-pathogenic for rabbits.

*Monilia Krusei* (Castellani): Mycelium fragile, readily falls apart. Reproduces by elongated buds. No chlamydospores, no ascospores. Short fuzz in gelatin. Ferments levulose and dextrose with the production of acid and gas. Giant colony, flat and smooth. Only slight cross-agglutination with other forms. Readily identified on direct agglutination. Non-pathogenic for rabbits.

*Mycoderma*: Mycelium abundant. Reproduces by oidia or arthrospores, no ascospores. Forms which produce blastospores as well as arthrospores are here provisionally grouped with the mycodermas. Atypical "pine tree" in gelatin. No fermentation of sugars in strains studied. Giant colony rough, membranous, sometimes slight development of aerial mycelium in forms from feces, which is similar to *Oidium lactis*. Not possible to get a good suspension for agglutination. Non-pathogenic for rabbits.

*Cryptococcus*: No mycelium, budding forms only. No ascospores. Nail in gelatin. All strains so far studied ferment dextrose and levulose with formation of acid and gas; some ferment saccharose and raffinose; some produce acid but none gas in maltose. Giant colony, smooth and pasty, occasionally corrugated, similar in appearance to *M. albicans*, usually cream colored. Pink forms also included here. Cross-agglutinates with albicans, candida, and saccharomyces serums. Absorption not yet carried out. Non-pathogenic for rabbits.

*Saccharomyces cerevisiae*: No mycelium, occasionally chains of elongated cells. Reproduces by budding. Ascospores, 1 to 4 in an ascus. Nail in gelatin. Ferments dextrose, saccharose, maltose, and levulose with the production of acid and gas. Giant colony, flat, dry, often with slight radial ridges, brownish with age. Very slight cross-agglutination with monilia serum. Non-pathogenic for rabbits.

*Willia anomala*: Mycelium rudimentary or none. Reproduces by budding. Hat-shaped ascospores, 1 to 4 in an ascus. Nail in gelatin. Ferments dextrose, galactose, and levulose with the production of acid and gas. Colony flat, wrinkled, with radial ridges, dry with age. Cross-agglutinates in *Saccharomyces cerevisiae* serums but separated by agglutinin absorption. Non-pathogenic for rabbits.

#### CONCLUSIONS

Most of the yeast-like microorganisms found in diseased and on normal skin fall within a few species. These may be defined and recognized by their morphology when grown on suitable mediums.

The classification so obtained correlates almost completely with that obtained by absorption of agglutinins.

Direct agglutination is of aid in the recognition of these types. The gross colony characteristics and fermentation reactions are of interest but are often misleading unless studied in conjunction with the microscopic morphology and immune reactions. The relationships of these forms to other species, and hence their permanent botanical classification, cannot be determined on the basis of our present knowledge. Some agreement as to a provisional terminology is, however, necessary to avoid confusion.

One species, *Monilia albicans*, is pathogenic for the skin though it apparently occurs as a saprophyte in the alimentary tract. The other species described are probably non-pathogenic.

REFERENCE

1. A detailed study of these forms is to be found in the *J. Infect. Dis.*, 49: 183-215, 1931.

The Typhoid Carrier in New York State

AT the close of the year 1930 there were, exclusive of carriers in state institutions, 244 chronic typhoid carriers upstate under supervision. Only 5 of these were found to have been responsible for cases of typhoid fever during the year 1931, a total of 7 cases having been traced to them.

Thirty-one newly discovered chronic typhoid and 2 paratyphoid carriers were added to the department's list during 1931. Fifty-four of the cases of typhoid fever which occurred in 1931 were traced to 18 of these newly discovered carriers. . . . During the year 22 carriers were removed from the records. Of these 8 died, 5 were released after gallbladder operation and the submission of the required negative specimens, and 9 removed to other jurisdictions. . . . The total number of typhoid carriers on record January 1, 1932, was as follows:

Upstate New York (exclusive of state institutions) .....	262
State Institutions .....	22
New York City .....	275
Total .....	559

Of the 33 new carriers, 12 were discovered through the routine examination of release cultures, typhoid bacilli continuing to be present in the feces a year or more after date of onset of typhoid fever. Seventeen were discovered through routine investigation to determine source of infection of sporadic cases of typhoid fever. . . . Of the 33 new carriers, 23 were females and 10 were males. None of the carriers was under 10 years of age. One carrier, a male, was 10 years old and 1, a female, was 23 years old. Four were from 30 to 39 years of age; 4 from 40 to 49; 9 from 50 to 59; 10 from 60 to 69; and 3 from 70 to 79; 1, a male, was 89 years old.

Of the 33 carriers, 2 were cooks, 18 were housewives, 2 of whom lived on dairy farms and another maintained a tourist home and kept boarders. One was a dairy farmer, and 12 had occupations which did not involve the handling of food.—*Health News*, New York State Dept. of Health, Mar. 21, 1932.

# What Constitutes Health Education in the High School\*

IAGO GALDSTON, M. D., F. A. P. H. A.

*Executive Secretary, Medical Information Bureau, New York Academy of Medicine, New York, N. Y.*

BY a slight change in the intonation of the title of this paper, "What constitutes health education in the High School" may be rendered as either the prelude to an affirmative statement or as the title of an inquiry.

It is my intention, however, to make this paper share in the nature of both an inquiry and an exposition: to question and to tell, the latter in a measure only, what constitutes health education in the high school.

Our inquiry must begin with the high school student. Before tackling the problem of the curriculum in health which should be followed in the high school we must know the nature of its students. Who are they? What is their number? What is their common social and economic position? What is the range of their intellectual capacities?

The answers to certain of these questions may be gathered from a study of the scholastic destinies and of the survival rates of the average 1,000 children entering grammar school.

According to the figures issued by the Education Office of the U. S. Department of the Interior, in 1928, the latest year for which statistics are available, of 1,000 entering the public school for the first time, 974 reach the 6th grade, 855 the 7th, and 768 the 8th and presumably graduate from public or grammar school.

Of the original 1,000, 610 enter high school, 438 reach the 2d year, 321 the 3d year, 268 the 4th year, and 260 are finally graduated from high school, of whom 160 enter college, and 50 are graduated.

To recapitulate, of 1,000 children entering public school, 14.5 per cent do not get beyond the 6th grade, 61 per cent enter high school, but only 26 per cent are graduated; 16 per cent of the original 1,000 or 61.5 per cent of those graduated from high school enter college, and 5 per cent of the 1,000, or roughly 20 per cent of those graduated from high school, also are graduated from college.

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There are approximately 4,250,000 high school students in the United States. Their common age range is 14 to 18 years. They come from, and will continue to constitute, the upper level of the middle class, economically, socially, and intellectually. They may be pictured as representing the hump of the distribution curve of our population; they are the high average.

The intellectual capacities of the high school student may be roughly gaged by his scholastic achievements. His social horizon, his social consciousness, may be assumed to be coextensive if not somewhat wider than that of the group from which he springs.

From a pragmatic viewpoint, therefore, and gaged by the standards current in our democratic nation, the high school group represents an important section of our population—one might almost say, the very backbone of our nation.

It is essential that we should fully appreciate the nature and sociologic position of the high school student, or else we may fall short in our efforts to serve him. The objectives of education being to fit the individual for effective adult life, we need to know the type of adult life which the high school adolescent has foreshadowed. Through such knowledge we may perhaps be better enabled to prepare him to his personal advantage, and to the vast benefit of the community.

We need also to know something of his psychologic stature. We must not approach him as if he were a passively receptive agent amenable to all our machinations. On the contrary, we must appreciate that he has aptitudes, interests, and preferences of his own, some of which are singular to him as an individual, and some characteristic of his age group.

All of these factors we must appreciate and take into account in formulating the answer to the query "What constitutes health education in the High Schools?" for we are not in a position to cut the garment from the whole cloth.

The foregoing is true of every educational approach, but particularly so in the instance of health education. To the factors enumerated there must be added another. The high school teacher of English, for example, knows with a substantial measure of certainty what training in grammar, spelling, composition, and reading the student who comes to him from public school has undergone. His own curriculum can be based on the preceding one and can thus form a continuity with it, but there is no such uniform training in health given to the public school pupil. In fact there is little certainty that the public school graduate has received any appreciable training in health in any form or of any sort. Witness of this may be found in

the widespread ignorance of, and indifference to, the fundamentals of personal hygiene prevalent among them, a condition which makes it necessary that the so-called health education in the high school should consist of campaigns or drives for clean teeth, proper food habits, the correction of constipation, skin hygiene, and the like, which properly belong to the curriculum of the lower 4 grades in public school.

One cannot therefore begin to formulate a program of health education in the high school without taking into account what training should be, but seldom is, given to the students in the public school, and I propose to set the stage, so to say, for the affirmative phase of our inquiry, by indicating what health knowledge and training the pupil entering high school is required to possess in order that an adequate and fitting program of health education may be possible in the high school.

To do this effectively we must divide the life of the student during his public and high school career into 3 periods, based on age and consequent attitudinal differences. The first period lasts roughly from 6 to 10, and takes in the first 4 grammar grades; the second includes the next 4 years, covering the remaining 4 grammar school grades, including at times what is termed junior high school; the third embraces the remaining years of the high school career.

If we divide our student body into 3 groups corresponding to these 3 age periods, we must at once perceive that these groups differ in their needs, in their psychologic attitude, and in their susceptibility to different pedagogic technics. The youngest group is more ready to accept authority. The middle group has the impelling curiosity of the adolescent. The high school group has a budding social consciousness which should be fostered and utilized for health education. The needs and capacities of these groups differ substantially. The youngest is more home-sheltered and less free in making its own choice than the older groups. Its interests are narrower, and its susceptibility to persuasion by science more limited. Its great need is for sound health habits contributing to growth and development. The elements of basic personal hygiene in terms of cleanliness, rest, exercise, outdoor play, and good feeding habits constitute the boundaries of its health interest.

Precept and repetition are effective pedagogic instruments applicable to this younger school group. The *ex-cathedra* statements on the basic needs of the growing child for proper food, rest, exercise and the like are acceptable to them on the authority of the teacher or parent. Scientific expositions beyond the barest simple facts are beyond their grasp and more often serve to confuse than to instruct.

There is little to be gained, for example, in drumming into the heads of children the term vitamins before they have a knowledge of the so-called mechanics of nutrition. They may be taught, parrot-wise, to repeat formulas, but like the parrot they speak without understanding. It is more profitable to confine health education within the immediate needs and grasp of children, and thus to hold and retain their interest and enthusiasm. They are responsive to the pedagogic technics which help build good health habits. Score cards, either personal or class, may be used without offending the nascent individuality of young children. The appeals of emulation, of belonging to the conforming group, of being approved of for doing the right thing, are stronger and more effective with younger children than with the older.

The first group then needs instruction and training in personal hygiene, in proper feeding habits, in cleanliness, in exercise and rest, and in kindred items. Personal hygiene as a cardinal theme in health education is proper in the first 4 grades. In the later periods it should hold a lower rank. If our work with the first age group has been properly done, it should not be necessary to dwell upon personal hygiene as such in the later classes. Some amplification and some modification of the early instruction will be required as the boys and girls grow older, but the groundwork will have been done in the first 4 years of school life.

The second age group, roughly from 10 to 14 years, differs radically from the first. It is less home-sheltered, less willing and less ready to accept without challenge the statement given on the "authority" of parent or teacher, more insistent upon being told why, and being convinced of the reasonableness thereof. The individual in this group exacts a larger measure of freedom in the choice of things, be it clothes, food or friends. He is also self-centered and curious to know about himself and his life. Life crowds in upon his consciousness and he craves enlightenment; he is eager to see the "works" of the machine.

Personal hygiene *per se* has little attraction for this intermediate group, but the construction and workings of the human body are its very meat. Health education should appreciate and meet the needs of this group. Biology, physics, chemistry, and history should converge to enlighten the adolescent on the wonders of the world and on the most interesting machine therein—the human body. In a dynamic, not static, fashion the structure and function of the human body should be taught, with as little insistence on minutiae and as much emphasis on the fundamentals as possible. The larger idea appeals to the young mind. The love of refinement and of details is the reward of maturity.

For instance, it is more important that the adolescent boy interested in the digestive system should know that it is a continuous pipe placed within the body cavity and that in it foods are mechanically and chemically broken down and prepared for absorption, than it is that he should have a knowledge of how to spell esophagus or jejunum. It is not to be understood that a knowledge of scientific terminology is to be disparaged. On the contrary the emphasis is rather on the value of "working knowledge." The first is desirable but this last is fundamental.

In the education of this group in health, the direction should be from the general to the specific, from the whole to the detail. Certain basic ideas on the human body need to be instilled into the consciousness of the young. They should understand that in the biologic sense the human body is a machine, and partakes of the nature of all machines in their subjection to certain universal laws of dynamics. Like all machines the human body does work, and transforms energy in the process. The study of physiology, in this sense, becomes a study of work methods, and that of anatomy a study of machine parts.

Through this method of approach the student may be given a "working knowledge" of the human body. Personal hygiene will of necessity enter into the study, since not only *how* the body works but *how it may work well* must be the theme. But, unlike in the early grades, personal hygiene will not be the primary subject, nor the authority of the teacher the basis for accepting the precepts. Conviction on the merits and value of the rules for proper living will come by the compulsion of scientifically derived conclusions. To this task should be devoted the last 4 years in grammar school, and possibly the first year in high school.

It is with such a training in health that the student entering high school should be equipped. Such training is the essential basis upon which a fitting curriculum in health education might be developed in the high school. Unfortunately, it is but rarely that we find such instruction in our public schools, and as a result our health education in high schools needs so frequently to be of the most rudimentary sort. The situation is truly preposterous; to appreciate it, imagine, by way of contrast, a high school student being taught spelling or the multiplication tables, and yet such is the approximate level of much of the high school health education.

I am leaving out of consideration all of the so-called health work which is carried on in the high schools, because I consider it more in the nature of service than of education. Many confound it with education, but it is no more instructive than any of the other common day

experiences. It is no doubt a distinct advantage to the boy to have his teeth repaired, his vision corrected, his posture improved, and his nutrition bettered, and, indeed, he may learn something about health during the process, but in its entirety this is health work, philanthropy if you please, but not health education. It is a paternalistic service which in a measure has been rendered necessary because we have failed to safeguard the child during its earlier development. It is cure made necessary by our failure to prevent the development of defects. I would not, if I could, put a stop to this work, but I am not willing to allow its inclusion under the heading of substantive health education.

The health education of the high school student should be projected on a higher and broader plane. Heretofore we taught health to the child purely in terms of himself. Now we must teach him to appreciate health in terms of the community and of the race as well. The health education of the grammar school was first made to serve the student's individual growth and development and later his understanding of the fundamentals of the human machine. Health education in the high school must teach the student to understand the nature of disease, disease prevention, and the meaning of health in terms of work, parenthood, and the performance of social and civic obligations.

The high school students differ essentially from their younger brothers and sisters; they are no longer boys and girls but young men and young women. The self-centered interest that served as the *vis a tergo* to his or her little realm has budded into a social consciousness which reaches out beyond the confines of home, school, and immediate family.

An intensified awareness of and interest in the opposite sex brings in its train a bloom of ambition. There is thought of job or profession. There is the deep desire to become a regular fellow, a successful person along the many lines of activity that characterize adult life, and above all there is in this stage of development much wondering as to the what, and how, and wherefore of social and communal life. The narrow interest in self of the childhood period has now been expanded into an interest in the relationship of the self to the rest of the mass. Health education must recognize this condition and utilize it for guidance in the construction of its curriculum and in the choice of its pedagogic technics.

There are aspects to both health education and to the larger health problem which transcend the individual, and have a meaning only when more than one individual is concerned. These aspects, these larger phases, should constitute the vital germ of the high school health education program. It is during this period that we have an oppor-

tunity, and also the obligation, to teach the young man and the young woman the significant health problems which deal with the home and the community, the hygiene of industry, and the health problems that come with adulthood, family life, children, etc.

What a grievous comment it is upon our educational program that many a young man and young woman graduate from our high schools with a tolerable knowledge of geography or of French, and with little or no knowledge of the care of children or the citizen's obligation to coöperate with his community health officers!

The young woman who within, say, 6 or 7 years will be a wife, and perhaps a mother, rarely receives in her high school period a knowledge of the rudiments of dietetics, which, if she but knew and could apply, would contribute so substantially to the maintenance of better health in our families.

The young man who is so soon to take his place in the shop or office receives but little information in the high school to enable him successfully to weather the industrial hazards and those of business environments.

Health education in the high school should take its cues from the realities of life facing young men and women, and be guided by these realities in determining the content of its curriculum. The young woman should understand how much of health depends upon the execution of the social health contract implied in social life; she should understand how the community safeguards its health through appointed health officers and legal ordinances; she should understand the health facts pertaining to motherhood; the basic facts of home care of infants and children should be made available to her; and there should be instilled into her a mental attitude that will enable her to profit by the expert medical knowledge that is available today. Dietetics, home sanitation, and home nursing should be included in her curriculum.

The young man should be taught as much, and in addition should be informed on industrial hazards, shop and office sanitation, and on those practices of personal hygiene, not excluding mental hygiene, which will serve to safeguard his health against the wear and tear of industrial and business life.

This is a large program, but if it be adequately distributed, and properly injected, as it belongs, into the formal studies which today constitute the high school curriculum, it can be executed without undue burden.

What does the high school student study today? Literature, mathematics, science, history, language, civics, biology, hygiene. He also receives a certain amount of physical training. Cannot history be

utilized to teach health? cannot civics include a proper description of the health aspects of communal life? What better end can science serve than to acquaint young men and women with the facts on dietetics, home, shop and office sanitation, and the like? Literature certainly ought to lend itself to health education, and even mathematics could be utilized to the same end.

There has long been a struggle among educators as to the precise meaning of "education." Some have been for the classical tradition, some for the utilitarian. I should loath to subscribe to that extreme utilitarian viewpoint of education enunciated, say, by Spencer, but we must all agree that if education fails to equip the growing boy or girl with the instruments of understanding which will enable him and her to function usefully and to survive, education itself is a failure, and who can deny that health is basic to both useful function and survival?

Though the temptation has been great, I have abstained from composing and presenting to you a detailed plan of health studies. By my understanding of the theme of this discussion, I have felt myself commissioned to analyze and set up criterions on the basis of which it would be possible to organize a detailed plan of study in any high school, and which would fit and allow for any peculiar local situations.

I should like, however, to sketch briefly the major concrete divisions of a plan of studies in health for a high school:

In the first year, corresponding with the junior high school grade, the student's knowledge of the structure and function of the human body should be rounded out. This knowledge need not be detailed and static, but general and dynamic. Even if the student is lacking in the fundamentals, by devoting 2 hours a week for a year it is possible to equip him with a knowledge of the essentials. This phase of the curriculum has been developed in detail.<sup>1</sup>

The second year should be largely devoted to developing a knowledge of disease processes and the means at our command for their avoidance and treatment. Such a study should begin with the general consideration of noxious agents, including germs. The manner in which toxic substances, including bacterial products, injure the body should be made clear. Subsequently, the defensive agents both without and within the body should be detailed; immunological agents such as vaccines, antitoxin, immune serums, and their uses might then be appropriately considered.

In the third year specific diseases should be studied, including those of childhood and their complications, tuberculosis, the venereal, and the degenerative diseases.

In the fourth year home and shop sanitation, home nursing, and

the hygiene, both physical and psychologic, of children, are proper subjects.

Mental hygiene as applicable to the student's person, and as a part of communal existence should be insinuated into the studies during the 4 years. In the last 2 years, special attention should be paid to the problems of work, of love and familial relations, and of friends and communal relations.

As a pedagogic technic the historical approach is particularly effective. It initiates the young into the adult group. It enables them to appreciate their heritage, and the traditions behind them. It serves to enthuse them. By dealing with the history of the development of hygiene, our knowledge of disease and disease prevention, of psychology and mental hygiene, the student is enabled to see in a large way what has gone before, he learns much of the substance of science and, best of all, he has a goal set before him.

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# Judging the Efficiency of the Enforcement of Sanitary Milk Regulations\*

JAMES D. BREW, PH. D.

*Milk Specialist, New York State Department of Health, Albany, N. Y.*

THE desire to measure efficiency and progress in any field of endeavor is a commendable characteristic of human nature. These two terms are relative, and different fields of endeavor differ widely in the extent to which efficiency and progress can be measured and expressed concretely.

Much depends upon what our interest is, in attempting to make such measurements. We may be interested primarily in the objective or tangible elements where measurements, expressed in mathematical terms, are usually possible—for instance, the number of miles of improved streets and the like in a given city. Or we may be interested primarily in the subjective or intangible elements where measurements are more difficult, if not impossible—for instance, the degree of illiteracy or of healthfulness among the inhabitants. We find, however, the objective and subjective combined in almost every field, and many people are naturally interested in the evidences of progress in both. The chief danger lies, however, in assuming that the subjective can be satisfactorily measured in terms of the objective.

In the field of sanitary milk control we are confronted with both: the objective, consisting of those tangible, visible and more or less easily measurable items that are recognized as necessary or in many cases desirable in milk production and distribution; and the subjective, consisting of the intangible, and more or less immeasurable end-result—a high quality, safe, palatable product. Any attempt to show progress in the first aspect alone, yields information of unmistakable value only regarding the general status of the conditions surrounding the production and handling of milk. Any attempt to show progress in the second, namely, quality, is commendable but is fraught with many uncertainties. Some of those factors that combine to make up quality are impossible of measurement; the others are, more or less, difficult to measure. With few exceptions, none bear any very close

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relation to the factors that combine to make up what we may consider as those desirable conditions which merely facilitate the production of quality. The ultimate end-result in milk control in many respects falls little short of being as intangible as that in the field of education, for instance, and is almost as difficult to measure and express in understandable terms. Any attempt to express quality of milk in terms of barns or milk plants is equally as unconvincing and illogical as to express the degree to which a student mastered the subject in hand, in terms of the classroom. All through the history of milk control attempts have been made to devise some method of showing progress, but none has proved convincing, probably because the originators not only failed to appreciate the inherent difficulties but also because they erred in thinking that because a proposed scheme appeared to be logical it must accurately portray the true conditions.

Shortly after 1900, for example, there was unanimous agreement that some mathematical scheme of rating milk control would greatly facilitate the work of health departments. At that time the erroneous theory that disease emanated from the surroundings still had a firm grip upon the prevailing conception of disease relationships; consequently all milk control was directed at the milk producer on the farm. It was felt that if the conditions surrounding production could be sufficiently improved, the problem would be solved. The idea was proposed that there should be some mathematical means of rating dairy barns. It was reasoned that such a rating would stimulate the producer to improve his conditions in competition with his neighbor and that these ratings would also serve as valuable office records for comparing one barn with another or for measuring progress in control. To meet this universally recognized need, the familiar numerical dairy barn score card was devised in 1904 to 1906 and played an important rôle in milk control procedures, particularly during the next decade or so.

The merits of the dairy barn score card were broadcast everywhere. This new method was seized upon enthusiastically by almost everyone. It furnished a mass of figures which appeared logical. So great was the faith in this innovation that control officials finally agreed upon different dairy score limits as a means by which different grades of milk could be defined. In other words, the higher the barn score the higher the quality of milk. It was at this point in the history of control that the original intent of the scoring method was officially perverted. There can be no denying the statement, however, that this method of rating dairies was an outstanding step ahead in bettering milk supplies in general. It had real educational value, and in spite of the fact that

many nonessential items were specified, there were being instituted, as a result, better practices in the handling of milk.

Interest in the numerical dairy barn score has shown unmistakable evidence of decline; particularly during the last 10 years. The reasons are clear and need no detailed elaboration. The producers' and consumers' conception of quality was and still is based upon factors that were a part of the milk itself—flavor, keeping quality, cleanliness and cream line. The conception of quality as held by control officials was and still is confined largely to factors related to public health, sanitation and the like. The dairy barn score in no way expressed either conception. It was the barn that was being rated and not the milk which the consumer purchased.

If a method of scoring anything could be devised that would, at least with a reasonable degree of accuracy, correspond to the public's conception of the thing being scored, then doubtless such a scoring method would be successful. There are certain inherent difficulties, however, which should be kept in mind. For instance, we might score all of the kitchens in a given city and secure data that would be interesting and doubtless instructive, but how many housekeepers would be concerned over the fact that a neighbor's kitchen scored 5 points higher because of an extra window? Then suppose some group of officials—following the precedent established during the first decade of this century in milk control—tried to maintain that the higher the score of the kitchen the better the meals prepared therein. The reaction that would follow is so obvious as to need no comment. Under any present-day plan of rating milk supplies, why should the inhabitants of Podunk be concerned because their milk supply rated 65 per cent while that of Squedunk rated 75 per cent, due to the greater emphasis in the enforcement of certain items which may or may not have had any sanitary significance?

When it comes to comparing the efficiency of the enforcement of sanitary milk regulations, we are confronted with almost insurmountable difficulties. The human element plays such a prominent part. Any group of individuals, for example, might visit a number of dairy barns or milk plants and in general agree that some were absolutely unfit places in which to handle milk, some fair, and some highly satisfactory. But just as soon as they should attempt to express their observations in terms of numerical ratings based upon various items, then the question of the relative importance of the various items would come up. Such decisions are difficult because of differences in opinion and in the end are arrived at arbitrarily. Most well thought out schemes fail to interest the public which does not see the barns that have been

white-washed, or the lack of cement floors, or even the method of cooling or of sterilization and the like. Herein lies one fundamental difficulty in arousing public interest in any rating scheme designed to express progress in milk control.

Wherever the economic aspects in any field are rendered as complex by public health matters as they are in that of milk control, it should be remembered that any attempt to measure progress, is very apt to confront the milk producing and consuming public with questions that prove confusing and which not infrequently entail more or less needless expense. The fact that the average investment per farm dairy throughout the United States is only about \$3,000 (at 6 per cent this allows a yearly income of \$180), indicates some of the real, fundamental limitations. The tendency for too many control officials is to allow their enthusiasm to overrule their judgment and, knowing subconsciously that their position of authority discourages challenge, they are prone to heap upon the shoulders of the milk producer and distributor requirements which have no demonstrable sanitary significance under the claim of potential, public health significance. The inclusion of too many requirements of this nature is in itself bound to lead one astray, even when the most seemingly logical plan of rating progress in milk control is employed.

Some of the difficulties so sure to be encountered in attempting to show, mathematically, progress in milk control by a plan in which is combined both the more or less immeasurable subjective and the measurable objective, is illustrated in the following summary of surveys published in 1930.

Before the adoption of the Standard Milk Ordinance (which occurred in 1923) the raw and pasteurized milk supplies of 152 southern municipalities were about equal in average public health quality to the *present* raw and pasteurized milk supplies of the 183 non-standard ordinance municipalities represented in this survey.

As a result of the adoption of the Standard Milk Ordinance the raw milk of the same 152 municipalities now has a rating of 91 per cent compliance with Grade "A" Raw Milk requirements compared with a rating of 65 per cent for the raw milk supplies of the 183 non-standard ordinance municipalities included in this survey. This represents a superiority of 40 per cent.

This quotation is cited with the sole thought of focusing attention upon some of the pitfalls into which one may be unwittingly led.

Having in mind the rapid increase in the amount of milk being pasteurized, tuberculosis control among cattle, improvements in construction, and in cooling, sterilization facilities, and the like, it is hard to believe that, after 30 years or more of control involving the expenditure of vast sums of public funds, the "public health quality" of

183 northern city milk supplies is no better than that of the 152 southern city supplies. To one who has made an intensive study of milk control policies, who is not committed to any particular ordinance or control policy, and who has seen in every section of the United States all kinds of dairy farms and milk plant conditions—good, bad and indifferent—the following questions are naturally suggested: Is there any conclusive proof to show that the milk supplies of these 183 northern cities are *actually* less safe, more dirty, poorer in flavor, keeping quality or in food value, than the 152 southern supplies? Are the general conditions surrounding production on the farms and handling in the plant less satisfactory? Is this difference, if any, significant? and how is the significance to be proved? Is it not possible that a similar survey, in which the “yardstick” used was based upon the New York State Sanitary Code requirements for Grade A raw instead of upon the Standard Ordinance, would have shown the milk supplies of New York State cities to be, at least, equal in “public health quality,” or perhaps even superior to those of southern cities? Viewing the problem of measuring progress in sanitary milk control from the point of view of the scientist, how are we to know whose “yardstick” is the correct one? Every ordinance written has been based upon the opinion of recognized authorities, and how are we to prove which group is or was the more nearly correct? It is unfortunate that the term “public health quality” was used, because in these surveys it was merely the degree of compliance with the requirements for Grade A milk, as defined in the Sanitary Code, that was being compared.

In another statement in this report is the implication that, as a result of enforcement the consumption of milk in these 152 standard ordinance municipalities increased 21 per cent. Extreme caution should be exercised in drawing any conclusions from data of this nature. According to data recently collected in our own department, the consumption of milk increased over the same period in the State of New York 31 per cent. If “quality” played an important part in increasing the consumption of milk in the south, how is this increase in consumption in the north to be explained?

Efficiency in milk control like the factor of safety in milk supplies, is purely relative. We may have our opinions as to the degree of efficiency in control or of safety in milk, or of the efficiency of any public school system, but when it comes to expressing efficiency in such fields in mathematical terms, we are immediately confronted with a maze of factors, some of which are more or less impossible of measurement, and the significance of some of which is merely a matter of personal opinion.

## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

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## LIFE MEMBERSHIP

LAST fall the Committee on Fellowship and Membership started a campaign to induce those in our membership who were qualified to do so to take out Life Membership in our Association. The financial depression made it a bad year for such an undertaking. Nevertheless, the movement has been highly successful, so that we wish once more to bring to the attention of our readers the advantages of taking this step.

On the part of the Association it means a permanent fund from which interest is drawn, thus supplying an income upon which we can depend. It means a decided diminution in fluctuation of membership, which in turn implies a unified body of public health workers upon whom the officers of the Association can count for advice and assistance. It means that we can predict our expenses from year to year with a greater degree of accuracy and an actual saving of office work in that there are fewer bills to be sent out at the beginning of the year, as well as follow-up letters for those who fall in arrears through oversight or for any other reason. A large body of Life Members will give a solidarity and permanence to our organization which can be obtained in no other way.

On the part of members, it means the saving of the annoyance of a bill at the first of the year when so many other dues become payable. For a large majority of our members, it means an actual saving, since

\$100 paid within the course of any given year makes them exempt from payment of dues during the remainder of their lives and assures their membership in the Association. Under the present laws the fee may be deducted from their income tax.

Let us all remember that while it may be hard during a period of depression to pay out \$100, this amount can be remitted in small sums at intervals during a whole year. Only those who have experienced the relief of not having a lot of bills for dues to societies come in on January 1 and each month thereafter can appreciate what it means to be free of them.

The committee have set a goal of 500 Life Members and they are much gratified to see the figure rapidly mounting since the Montreal meeting toward the first hundred. This is an increase of almost 100 per cent over the previous 4 years.

For our own good as well as for the benefit of the Association, to which we owe so much, and to which we are all so devoted, let us make an effort and greatly increase the number of Life Memberships.

### WHAT IS KNOWN ON VITAMIN B DEFICIENCY

TWO laboratories have now announced the isolation of vitamin B ( $B_1$ ) in pure form, Dr. B. C. P. Jansen in Holland, and Dr. Windaus in Germany. The products they describe, however, differ in chemical composition and in physiological activity. Jansen, who first published his method in 1927, has a crystal which contains carbon, hydrogen, nitrogen, and oxygen and is protective against polyneuritis in test rats with a dosage of 0.015 mg. per day. Dr. Windaus's product contains sulphur in addition to the elements reported by Jansen, and is said to be three times as potent.

These discoveries indicate important progress toward chemical identification even though the discrepancies suggest that the goal is not yet attained.

We need more data on vitamin B. Since 1926-1927 when the late Dr. Goldberger and his colleagues first showed that the water-soluble vitamin B of McCollum's nomenclature contained at least two distinct vitamins (now called vitamins B or  $B_1$ , and G or  $B_2$ ) it has become important to delimit the physiological effect of each and their distribution in common foodstuffs.

Water-soluble B is widely distributed in natural foods. When the foods are assayed to determine their relative content of B and G it develops that whole cereals and yeast are rich in B, and relatively lower in G content. Milk, fruits, and vegetables on the contrary have

proved generally richer in G than in B. This fact has led Dr. McCollum recently to comment on the value of his "protective foods" as G supplements to a high cereal diet. The assays, however, also indicate that the B<sub>1</sub> content of the ordinary varied diet may not be as rich in B<sub>1</sub> as we have assumed on the old water-soluble B assay basis.

Dr. McCarrison was the first to suggest the rôle of B<sub>1</sub> in diet and his views have been summarized by Sherman<sup>1</sup> as follows:

B<sub>1</sub> deficiency may result in

1. Impairment of the neuro-muscular control of the bowels
2. Impaired transport of intestinal contents along the canal
3. Impairment of assimilative power
4. Impairment of secretory function
5. Impairment of protective resources leading first to mucous membrane infection and hence to systemic infection

Its relation to anorexia was established by Karr and Cowgill.

More recent work confirms its importance in the regulation of gastrointestinal function and certain types of constipation and colitis.

Such importance as is indicated by the above list need not, however, occasion alarm as to dietary inadequacy in this factor. Acute deficiency in the average American dietary would be rare. Partial deficiency or sub-optimal conditions are probably more common and suggest attention. In the study of these sub-optimal cases the newer discoveries and products promise valuable aid to the clinician and laboratory workers.

#### REFERENCE

1. Sherman, H. C., and Smith, S. L. *The Vitamins* (Rev. ed.), 1931.

## RECORD FORMS

RECORDS for health department service have heretofore been developed by individual cities to meet their individual needs. Lack of uniformity of information and interpretation of services rendered was inevitable. With the rapid growth of health work, the general acceptance of the *Appraisal Form* and the interest shown in the Inter-chamber Health Contest of the National Chamber of Commerce by many of the smaller cities, a demand arose that this condition be remedied.

The forms prepared by the Sub-committee on Record Forms of the A. P. H. A., and now for sale, meet the situation. The needs of the smaller city were kept foremost in mind, a uniform nomenclature and code was adopted, following those believed to be the most universally accepted.



The records drafted demand a minimum of notation, ask no irrelevant questions, and yet contain essentials for the maintenance of service. Standard sizes were adopted to fit standard filing systems and to eliminate waste. In the development of each record, it was referred to active workers in the field for criticism and suggestion. Each record has had actual use in the field and should be satisfactory under most conditions.

Adoption of the records places in the hands of the health officer a means of obtaining facts which will assure him that his department is functioning properly, will point out needed lines of development, and will also be a means of obtaining facts to meet the forces that demand a curtailment in health service.

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### LETTER TO THE EDITOR

TO THE EDITOR:

On March 19, an Associated Press release was given rather wide publicity throughout the country, quoting me on the "economy budget" of the Chicago Board of Health.

Unfortunately, the reporter's version of the interview contained several statements and implications not in accord with my views and, in my opinion, not consistent with sound public health policy.

Realizing that the article as a whole may prove embarrassing to health officers in other localities, I desire to correct certain of these erroneous impressions and make my position clear in the matter.

The implication that I favor curtailment of present health budgets generally as wasteful or extravagant is a perversion of my statement that health departments unavoidably facing shrinkage of income should curtail at the expense of the less important functions, particularly the refinements of hygiene and sanitation and those activities affecting personal comfort rather than health.

I believe that fundamental health protection should be maintained and even augmented at all costs—during times of economic stress.

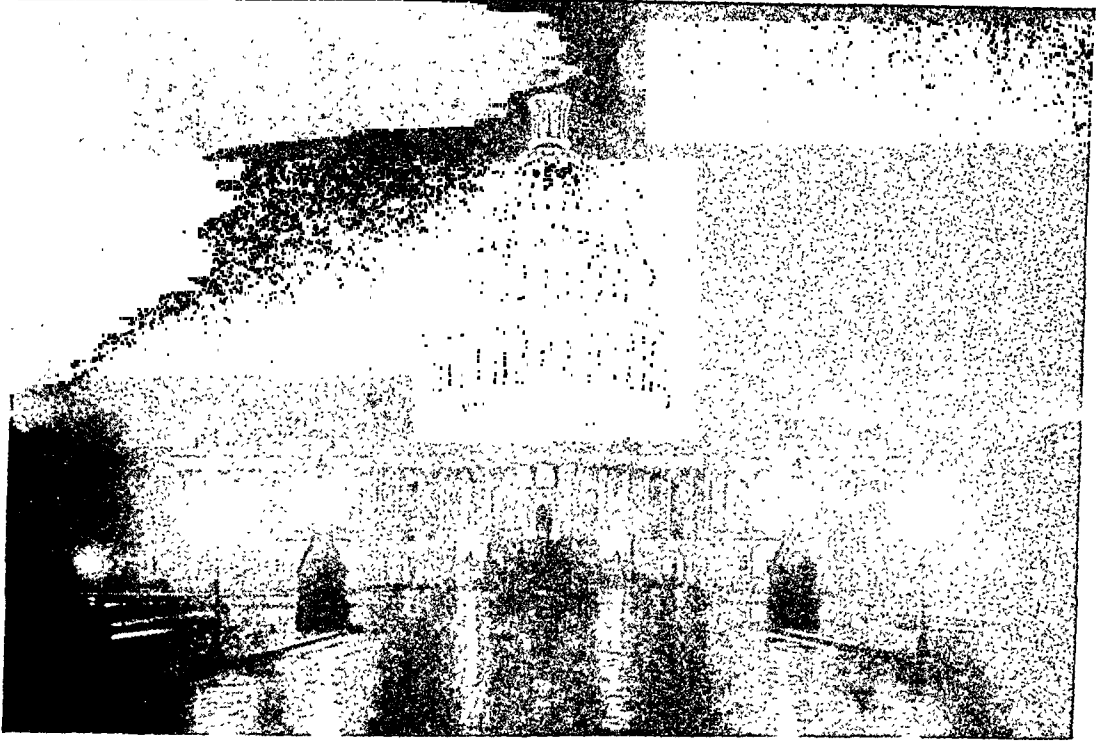
My statement in regard to politics in boards of health was simply that, unfortunately, politics does control in some localities and, therefore, has to be reckoned with.

In Chicago we have succeeded in pruning about \$500,000 from our health budget, without grave impairment of essential lines of health protection. We have even provided for increased nursing service, and we have done this largely at the expense of the clerical service and the less important sanitary inspection having to do primarily with the esthetic. This was done in connection with a complete reorganization of personnel.

We are not advocating such cuts—in fact, we deplore their necessity—but we believe that in Chicago we shall be able to carry on the primary essentials, for the time being, without risk to public health.

I feel that health authorities are entitled to some reassurance regarding this interview, and should have available a corrected statement for use in counteracting unfavorable reactions affecting their own budgets.

HERMAN N. BUNDESEN, M.D.,  
*Commissioner, President, Board of  
Health, Chicago*



UNITED STATES CAPITOL—Construction of the hall of the House of Representatives was begun ten years before the first gun was fired in the Civil War, and the Senate chamber wing was started soon afterward. The Capitol is 751 feet long, contains a total of 431 rooms and the cost of construction was \$14,550,000. The Capitol is one of the many old buildings of Washington, and an outstanding example of good architecture. The Corinthian order is used in the external embellishment of the building. Its location "on the hill" is superb and it is one of the most impressive buildings in Washington.

## NEW WASHINGTON

WILLIAM DE KLEINE, M. D., F. A. P. H. A.

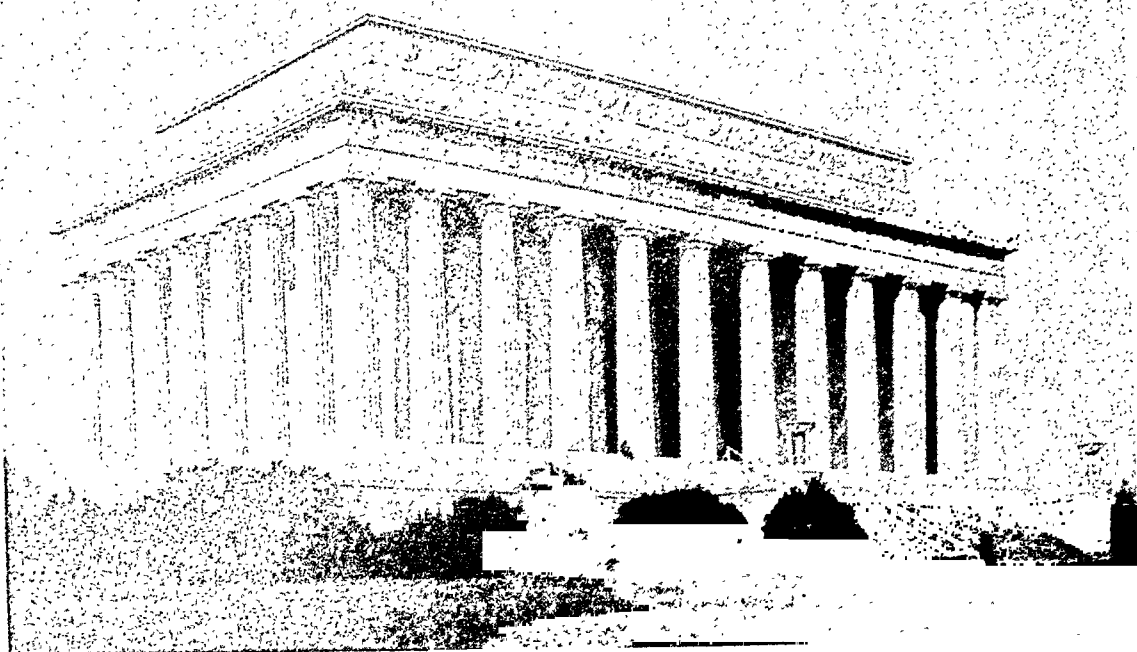
*American Red Cross, Washington, D. C.*

VISITORS who come to the national capital will be immediately attracted by one of the most interesting and stupendous projects in public improvement construction work ever witnessed in this country. A \$250,000,000 program of beautifying the city and of erecting commodious buildings to house departments of government is now in progress. Beautiful parks and landscapes with reflecting pools and sparkling fountains; magnificent, massive and monumental buildings—some just completed and others under construction—will greet the eyes of visitors. Those who have not been in the city for a year or more will be surprised and thrilled

by this spectacular development that is destined to make Washington one of the most attractive of all the world capitals.

Those entering the city through the Union Station will see the new Capitol-Union Station Plaza development, which enlarges and beautifies the Capitol grounds. Half way between the Union Station and the Capitol is a new reflecting pool in which is mirrored the dome of the Capitol, and there is also a new fountain.

Facing the Capitol, as a companion building to the magnificent Library of Congress—the largest of its kind in the world—there is under construction the



**LINCOLN MEMORIAL**—The Lincoln Memorial was designed by Henry Bacon and was erected at a cost of \$2,000,000. It was dedicated on Memorial Day, 1922, by William Howard Taft. The memorial is on a circular terrace 1,000 feet in diameter. Stretching to the east of the classic structure are large reflecting pools which mirror the memorial and also Washington Monument nearby. The memorial is a classic Grecian structure with a main hall 70 feet by 60 feet. There is a colossal statue of Lincoln seated in a chair. It was carved from Georgia marble.

new Supreme Court Building which will cost approximately \$15,000,000. Close neighbor to this is the artistic Folger Memorial Library, in which is treasured the matchless Shakespeariana Collection. This is a most artistic building costing \$10,000,000—a new child in Washington's family of magnificent edifices. This library was founded as a repository of rare editions and literary treasures, rather than for the circulation of books. It contains 75,000 volumes collected by Henry Clay Folger during the last five decades of his life. What Mr. Folger himself called "the most precious book in the world," with some 350 other specially valuable volumes, was brought from New York to Washington in an armored car with five guards. This book is the Vincent first folio of 1623, containing the earliest printed version of some of the plays included in the Shakespeare canon. Another collection of outstanding value is the poems in-

cluding "Venus and Adonis" printed in 1599 and valued at \$75,000.

Visitors who heretofore have been whisked away from the Union Station along unpretentious side streets may now approach the heart of the city along a broad new avenue, leading to Pennsylvania Avenue, which is the historic parade ground of the nation. This new avenue goes within two or three blocks of another elaborate development just west of the Capitol—the old Botanic Garden with its up-to-date conservatory, lecture, and exhibition rooms. It also leads to the Mall, which is a large triangular area south of Pennsylvania Avenue extending from the Capitol to the Lincoln Memorial.

The Mall was originally laid out by George Washington and Major L'Enfant as a great central garden for the city of Washington. This area is now being redeemed by the federal government and gradually transformed into beautiful

parks and gardens. Old buildings have been removed and new ones are under construction. What was formerly B Street from the Lincoln Memorial past the Capitol has been straightened, widened and renamed Constitution Avenue. This beautiful avenue connects the Capitol with the New Arlington Memorial Bridge, the new Washington Memorial Highway and Arlington National Cemetery.

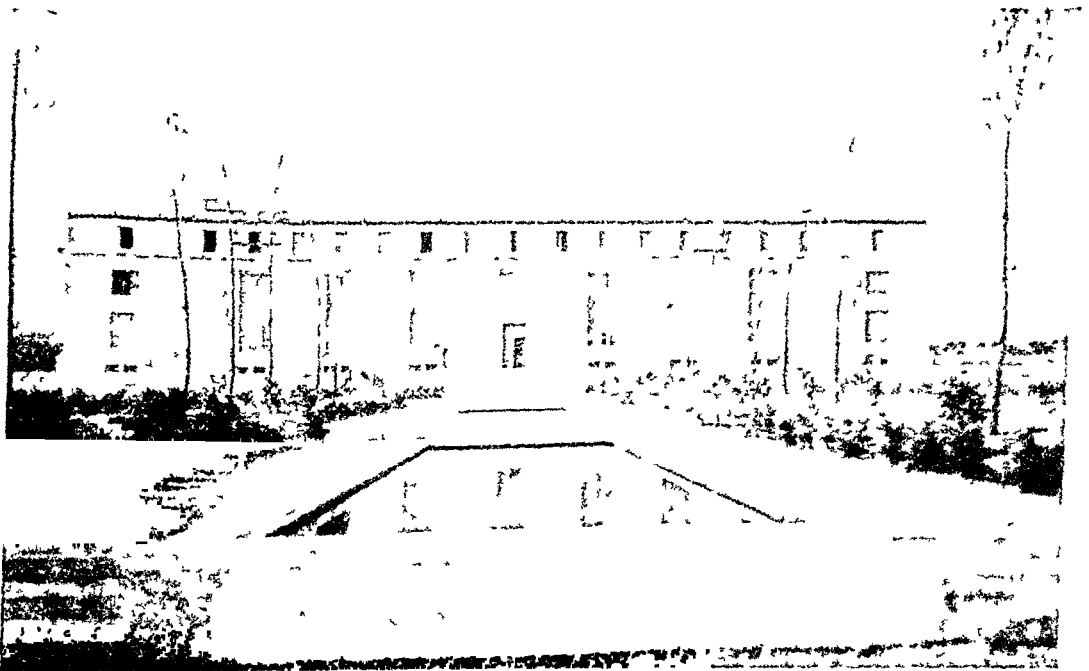
Where Constitution Avenue and the new Louisiana Avenue from the Union Station meet Pennsylvania Avenue across the Mall, there has been created "Union Square" as a cross axis of the Mall. This is graced by another beautiful mirror basin comparable with the one between the Washington Monument and the Lincoln Memorial.

Facing the Union Square from the north, visitors may see rising what is designed to be the most magnificent

municipal center in the country. It will occupy four large city squares. It lies directly south of the original Municipal Building, now occupied by the Supreme Court of the District of Columbia.

Across the Mall to the south another large group of government buildings is being erected for the War and Navy Departments. In that part of the Mall triangle, between the Capitol and the U. S. Treasury building, is rising an imposing group of buildings which constitutes one gigantic conception of utility and beauty. Within these buildings will be housed many of the departments of government which for year have been kept in rented quarters and temporary buildings.

One of the greatest new buildings—the Department of Commerce—gracing this triangular area, has been completed and is now occupied. The plans for it



**NATIONAL ACADEMY OF SCIENCES**—The National Academy of Sciences, with its pools and gardens, was designed by Bertram G. Goodhue as a portion of the surroundings of the Lincoln Memorial. It is the place where sightseers may view sunspots and instruments for measuring the almost immeasurable. It represents pure science in the discovery of facts destined to become useful.

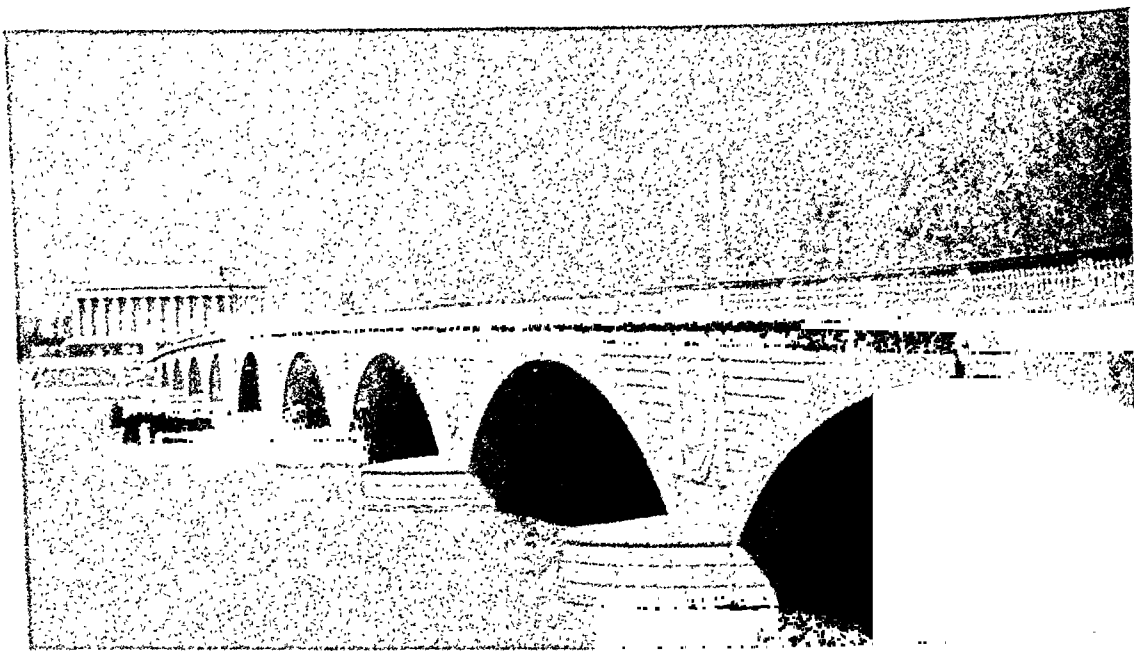
were laid when President Hoover was the Secretary of Commerce. He also laid the corner stone. The building is longer than the Capitol and cost about \$17,500,000. Its basement is said to be large enough to store three of the largest ocean liners.

Another great federal structure under way, in which delegates of the American Public Health Association convention will be particularly interested, is the new marble building for the U. S. Public Health Service. It is located on Constitution Avenue not far from the Lincoln Memorial. This building will be ready for occupancy the latter part of 1932 or early 1933. Public health leaders over the entire country will be glad to know that the U. S. Public Health Service will soon come into its own, after having been housed in inadequate quarters for so many years. The recent expansion of the work of the Hygienic Laboratory, now the National Institute of Health, is another milestone

in the progress of public health service and a recognition of its significance in our national and community life.

A close neighbor to the White House is another group of three artistically designed buildings, occupying an entire city square—the headquarters of the American National Red Cross. The last one of this group has been completed and will be occupied in July. The buildings are all of white marble in Grecian style. When the landscaping has been completed and the final touch of the artist applied, this square will be one of the beauty spots in Washington.

A great coordinated development including the Arlington Memorial Bridge, spanning the Potomac, and the Memorial Highway from Washington to Mount Vernon, has recently been completed. This development is intended as an outstanding tribute to George Washington. The bridge is said to be the largest draw-bridge in the world. Huge electric motors operate the two



ARLINGTON BRIDGE—This development has been carried out as a tribute to George Washington. The bridge is 2,150 feet long and cost \$7,000,000. The Arlington Memorial Bridge is said to be the largest draw bridge in the world and the draw opens and closes in 5 minutes. The bridge runs into the new Mount Vernon Highway, said to be the finest piece of roadway construction in the world. With the completion of this roadway, the dream of statesmen for nearly a century has at last been realized.

ponderous 6,000-ton jaws of the draw. The bridge has nine segmental arches of 166-feet span at the ends, and spreads gradually to 184 feet in the central arch. It is 90 feet wide including sidewalks. This makes it almost the width of Fifth Avenue, New York.

The Memorial Highway, stretching for about 15½ miles from Washington to Mount Vernon along a route skirting the Potomac River, was designed by the Bureau of Public Roads of the U. S. Department of Agriculture and intended to be the best example of road building ever undertaken by the federal government.

The national capital has another new structure which is conceded by authorities to be the finest Reptile House in the world. This palace is one of a number of buildings in the Zoölogical Gardens located in picturesque Rock Creek Park. It is attracting scientists and zoölogists from all over the United States and from many foreign countries. This Reptile House combines the finest features of zoölogical gardens in both the old and new worlds. Striking in its architectural splendor, the edifice of Italian Mosaic is profusely decorated both inside and out with colorful stones and with statues and models of odd reptiles of prehistoric and modern times. The interior walls are of marble, the floor is of terrazzo, and the living exhibits are housed in colorful compartments painted and decorated with living shrubbery in a way to simulate the native habitat of these strange denizens of the wilds. Visitors can see here a facsimile of native scenes from the world's outlands.

One of the main attractions of this

famous reptile collection is the 14-foot King Cobra, most dangerous and aggressive of ten species of deadly cobra. It was this famous snake that created so much excitement when it was brought down from the New York Zoo to Washington. It slept in a Pullman berth in a special satchel which its keeper carefully covered with warm blankets to protect its health. This cobra is the presiding genius over this priceless collection of reptiles.

While it is the purpose of this article to stress new developments in Washington, it should be said in passing that there are hundreds of other attractions in the city that are not new. The beautiful Lincoln Memorial and the stately Washington Monument, each standing on a large circular terrace, the Academy of Sciences, the Smithsonian Institution, the Washington Cathedral, the Library of Congress, Mount Vernon, Arlington National Cemetery, the Capitol and the White House, are among the attractions seldom neglected by visitors.

Washington is indeed on the move. It is rapidly taking its place among the most attractive cities and capitals of the world. It has aptly been called a "Paradise of Parks." It is a city of open spaces where peace and comfort are evident on every hand. Visitors who view its constantly increasing wonders will enjoy a peculiar thrill at the thought of citizenship in a country where the ideals of life itself, as well as of individual and community achievement, remain the ever guiding principles that determine the destiny of the nation.

NOTE: The materials for this paper were provided by the Greater National Capital Committee of the Washington Board of Trade.

# ASSOCIATION NEWS

## WESTERN BRANCH A. P. H. A. THIRD ANNUAL MEETING

THE Western Branch of the American Public Health Association was organized in 1928, and with the sanction of the parent body, the American Public Health Association, has increased its membership to over 1,600 during these 4 years. Its purposes are to offer western public health people opportunities for exchange of experience, interchange of views with our eastern colleagues, and in general to promote western public health development.

Three major items of special western importance will be included on the program at the Denver meeting: Psittacosis, now apparently endemic in native western birds of the parrot family, to be discussed by Dr. Karl F. Meyer of the Hooper Foundation, San Francisco; reciprocal relations for the control of shell fish in Pacific ports to be discussed by the state health officers of California, Oregon, and Washington; Rocky Mountain spotted fever, with special reference to its similarity to

typhus, discussed by Dr. R. H. Riley, Health Officer of Maryland. Several national as well as western public health problems will be discussed by both eastern and western authorities.

The meeting is to be addressed by Dr. Louis I. Dublin, President of the A. P. H. A. The presiding officer will be Dr. E. T. Hanley, City Health Officer of Seattle, President of the Western Branch. Other national authorities who have accepted invitations to appear on the program are: Dr. John Ferrell, President-elect, A. P. H. A.; Dr. E. L. Bishop, Chairman of the Executive Board, A. P. H. A.; Dr. Kendall Emerson, Acting Executive Secretary, A. P. H. A.; Dr. Taliaferro Clark, Acting Surgeon General, U. S. Public Health Service; Dr. H. W. Hill, Professor of Bacteriology, and Nursing, and of Health, University of British Columbia, Vancouver; Dr. M. P. Ravenel, Editor, *American Journal of Public Health*, and others.

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A. P. H. A. by the Sub-committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

### *Health Officers Section*

Richard Binion, M.D., City Hospital, Milledgeville, Ga., Chairman, Baldwin County Board of Health

Tillman C. Britt, M.D., P. O. Box 605, Washington, N. C., Beaufort County Health Officer

Everett E. Carrier, M.D., Dyer County Health Unit, Dyerburg, Tenn., Director

Frank B. Clark, M.D., Gainesboro, Tenn., Director, Health Unit District 2

Preston H. Edwards, Jr., M.D., Franklin, Tenn., Assistant Health Officer, Williamson County

W. K. Fishburne, M.D., Moncks Corner, S. C., Director, Berkeley County Health Department

Ross L. Gauld, M.D., Jonesboro, Tenn., Assistant Director, Washington County Health Department

Edwin B. Gute, M.D., 5630 N. Lake Drive, Whitefish Bay, Wis., Health Commissioner

O. P. Hampton, Jr., M.D., 6801 Delmar Blvd., University City, Mo., Health Commissioner  
 Thomas H. Haynes, 516 West Vine Ave., Knoxville, Tenn., Director of Public Welfare

Robert D. Hollowell, M.D., Health Unit, Blountville, Tenn., Assistant Medical Officer, Sullivan County

Robert H. Hutcheson, M.D., Murfreesboro, Tenn., Assistant County Health Officer, Rutherford County Health Department

Wilson W. Knowlton, M.D., Rm. 546, State House, Boston, Mass., State District Health Officer

Marriott T. Morrison, M.D., 4705 Washington Ave., St. Louis, Mo., Chief Physician, Venereal Clinic, Department of Health

L. E. Viko, M.D., Public Safety Bldg., Salt Lake City, Utah, Health Commissioner

#### *Laboratory Section*

Carlos Bou, Department of Health, San Juan, P. R., Assistant Serologist

Luis S. Davila, P. O. Box 403, San Juan, P. R., Assistant Bacteriologist

Rollin W. Hoyt, 352 Western Ave., Boston, Mass. (Assoc.)

Dr. Jose Marques-Torres, Department of Health, San Juan, P. R., Pathologist

Americo Serra, M.D., Ponce, P. R., Director, Ponce Branch Biological Laboratory

#### *Vital Statistics Section*

Anna M. Scholfield, City Registrar's Office, City Hall, Providence, R. I., Statistician

#### *Public Health Engineering Section*

Alberto P. Amarante, C.E., Av. Afonso Pena No. 2524, Belo Horizonte, Brazil (Assoc.)

J. Lashley Johnson, State Department of Public Health, Nashville, Tenn., Sanitary Inspector

Robert McK. Clouse, Franklin, Tenn., Sanitary Inspector

Philip L. McLaughlin, Ohio Water Service Co., 59 Lincoln Way E., Massillon, O., Division Sanitary Engineer, Federal Water Service Corp.

Ira D. Ogle, Sumner County Health Unit, Gallatin, Tenn., Sanitary Inspector

#### *Food and Nutrition Section*

Rex D. Bushong, D.V.M., Department of Health, Nashville, Tenn., Associate Milk Specialist, U. S. Public Health Service

#### *Child Hygiene Section*

Franklin M. Erlenbach, Jr., D.M.D., 358 Commonwealth Ave., Boston, Mass., Clinician, Brookline Public Schools

#### *Public Health Education Section*

John W. Amesse, 624 Metropolitan Bldg.,

Denver, Colo., formerly President, Denver Public Health Council

Grace J. Blank, Chandler Court, Williamsburg, Va., Instructor in Public Health and Physiology, College of William and Mary  
 Isabelle F. Borden, M.D., State Education Dept., Albany, N. Y., Supervisor, School Medical Inspection

Herman E. Cohn, 1341 W. Madison St., Chicago, Ill. (Assoc.)

Julia L. Cummings, State Office Bldg., Hartford, Conn., Secretary, Connecticut Tuberculosis Committee

Myrtle Curnutt, 542 Fifth Ave., New York, N. Y., Director, General Health Bureau

John L. Fuller, Department of Biology and Public Health, M. I. T., Cambridge, Mass., Assistant

Allan J. Hrubby, M.D., 1130 N. Lorel Ave., Chicago, Ill., Secretary, Board of Directors, Chicago Municipal Tuberculosis Sanitarium

Rosa Kuntz, Dresden, Tenn., County Nurse

Edward L. Markthaler, M.D., 1513 State St., Santa Barbara, Calif., Director, Health Education, State Teachers College

F. B. Morgan, State Department of Health, Nashville, Tenn., Associate in Health Education

Margaretta A. Smith, 237 Thompson St., New York, N. Y., Assistant General Director, Judson Health Centre

#### *Public Health Nursing Section*

Mary Bedford, R.N., Trenton, Tenn., Supervising Nurse, Gibson County Health Department

Myrtle T. Cross, R.N., Franklin, Tenn., Public Health Nurse, Williamson County Health Department

Velma DeMoss, R.N., Trenton, Tenn., Public Health Nurse

Nina E. Garrison, R.N., Franklin, Tenn., Public Health Nurse

Frances F. Hagar, R.N., Murfreesboro, Tenn., Chief Nurse, Rutherford County Health Department

Mrs. T. O. Hall, Box No. 12, Dayton, Tenn., County Public Health Nurse

Maude Hodge, R.N., Erwin, Tenn., Public Health Nurse

Margaret McC. Johnson, 516 W. Vine St., Knoxville, Tenn., Director, Knoxville Public Health Nursing Service

Martha P. Kelly, R.N., 904 Fair St., Franklin, Tenn., Public Health Nurse

Ora P. Moore, R.N., Trenton, Tenn., Public Health Nurse

Mrs. Nell T. Pearson, R.N., Humboldt, Tenn., Public Health Nurse, Gibson County Health Department

Mrs. Carrie K. Reynolds, Sumner County



Health Department., Gallatin, Tenn., Public Health Nurse

Ruth Skelley, R.N., Franklin, Tenn., Public Health Nurse

Roane Thornton, Gainesboro, Tenn., County Public Health Nurse, District 2

Archie Weatherly, Waverly, Tenn., Humphrey County Health Nurse

Josephine M. Wright, Gainesboro, Tenn., U. S. Public Health Service, Trachoma Prevention

#### *Epidemiology Section*

Jane N. Baldwin, M.D., Vassar College, Poughkeepsie, N. Y., College Physician

Irvin W. Sander, M.D., 1512 St. Antoine St., Detroit, Mich., Student (Assoc.)

#### *Unaffiliated*

Joseph H. Bishop, 157 E. Norwich Ave., Columbus, O., Student (Assoc.)

W. Compton Wills, 16th & French Sts., Wil-

mington, Del., Chief Engineer, Board of Water Commissioners

#### DECEASED MEMBERS

Peter H. Bryce, M.D., Ottawa, Ont., Canada, Elected Member 1883, Fellow 1922

Henry H. Brinkerhoff, M.D., Jersey City, N. J., Elected Member 1918, Fellow 1923

Louis Shapiro, M.D., Bangkok, Siam, Elected Member 1922, Fellow 1923

Mrs. M. W. Ainsworth, R.N., Sioux City, Ia., Elected Member 1928

John O. Polak, M.D., New York, N. Y., Elected Member 1929 (Assoc.)

Vinton A. Selby, M.D., Clarksburg, W. Va., Elected Member 1924

Joseph P. Yaffe, M.D., Boston, Mass., Elected Member 1930

O. I. Bemis, M.D., Modesto, Calif., Elected Member 1931

## LETTER FROM GREAT BRITAIN

### THE VALUE OF THE TUBERCULIN TEST

THE subject of tuberculosis appears to have received quite a marked amount of attention from investigators in this country recently. Within a few weeks of each other there have been issued two official publications, one from the Medical Research Council and the other from the Ministry of Health.

The former is a report by Dr. D'Arch Hart, Assistant to the Medical Unit, University College Hospital, London, while the latter is described as "A Report on Tuberculosis, including an Examination of the Results of Sanatorium Treatment," by Dr. MacNalty, Senior Medical Officer for Tuberculosis, in the Ministry of Health.

Dr. Hart, in his report, gives the results of tests performed upon a large number of clinically tuberculous patients of all ages and types of infection, and in contrast with these the effects following tuberculin tests applied to an almost equal number of clinically non-tuberculous individuals of all ages.

Many interesting observations are based upon the observations made, some of them being of real value and importance. Chiefly, Dr. Hart finds himself in a position to assert that the tuberculin test is one of scientific accuracy, though he qualifies this by saying that it is only so if the intracutaneous (Mantoux) test is used.

For the von Pirquet cutaneous test he has practically not a good word to say so far as reliability is concerned. Positive reactions, Dr. Hart warns, are not as yet capable of distinguishing an active tuberculosis from "the benign results of infection that has at some time or another been implanted in most members of an urban population."

The error in the case of the negative reaction being only about 2 per cent, its diagnostic value need not be questioned. This is particularly so in the case of children who have not become sensitized to tuberculin by chance exposure to infection. The possibility suggests itself that the test may be of real value from the preventive point of view by indicat-

ing the need for securing protection for individuals in households where a tuberculous patient has been living.

One of the beliefs Dr. Hart claims to have shattered as a result of his observations is that tuberculous infection is universal in later childhood among the poorer classes or general population of urban communities. This view was based upon the results of some of the prominent earliest tuberculin surveys, but in the case of London and some European and American cities appears to be untenable, as many as one-third or more of the clinically non-tuberculous children now being found to react negatively to the intracutaneous test at the age of puberty.

#### TWENTY YEARS OF TUBERCULOSIS SCHEMES

DR. MacNalty, though described as Senior Medical Officer for Tuberculosis, has interests and activities very much wider than this title would suggest. The work he has done in relation to diseases of the central nervous system is very well known, particularly his official reports on encephalitis lethargica. These and his lectures as Milroy Lecturer of the Royal College of Physicians in 1925 on epidemic diseases of the central nervous system, indeed, have secured for him a reputation that has extended far beyond the boundaries of Great Britain.

The possibility that this report on tuberculosis may go some way towards enhancing that reputation is not impossible, for, though ostensibly he treats of the problem from the local point of view, any study of tuberculosis and any information submitted with regard to it must have a wide application and call for attention from everybody concerned in dealing with the disease.

Dr. MacNalty's primary object has been to carry out a survey of the work done in relation to tuberculosis since the more or less general establishment

of anti-tuberculosis measures by local health authorities. As something like 20 years have elapsed since this happened, this would seem an appropriate time for making such an examination. The system adopted is an interesting one, and the ground appears, so far as can be judged by present-day lights, to have been very properly and completely quartered.

Figures that suggest that there is a decline both in incidence and mortality are set out, though a statement, bluntly made, that "there are no accurate figures available in regard to incidence of tuberculosis in England and Wales," is likely to startle and even annoy those complacent ones—of whom there are probably many—who cannot imagine any schemes with which they are associated doing other than superlatively.

The system of notification has been in operation for round about 20 years and, like any such system, works very much more satisfactorily as a means of providing information upon which preventive action can be based than as a method of providing amusement for the statistically minded. For these latter the death rates are a more accurate and fruitful source of entertainment. In the case of tuberculosis, to the preventive officer they afford gratification also, revealing that between 1901 and 1929 the standardized death rates per million have fallen from 1,807 to 932.

In his report, Dr. MacNalty explains fully the methods that have been followed and that may be taken to have assisted in bringing about this result. Having examined these carefully, the conclusion he arrives at is that "the diminishing figures of tuberculosis year by year afford great encouragement to anti-tuberculosis work and proof of its value." And of sanatorium treatment, the results of which he set out to investigate, he finds himself able to say that it is the most effective method of treating the disease.

As a contribution to the literature of tuberculosis and a review of practice in relation to the preventive treatment of the disease, Dr. MacNalty's report has very much to commend it.

SIR WILLIAM R. SMITH

BY the death of Sir William R. Smith, which occurred rather suddenly on March 17, public health and preventive medicine lost a figure of some prominence. Though he had never actually held a post as medical officer of health, he was responsible for the training and teaching of large numbers of those now in office in various parts of the world. One of his claims was that it was he who was primarily responsible for having it made law that before an individual could be appointed to such a post he must possess specified qualifications.

The Royal Institute of Public Health, of which he was Principal and, in fact, the founder and central figure, provided full courses of training for such qualifications. In addition, it functioned as a learned society dealing particularly with preventive medicine, and provided facilities on a commercial scale for carrying out chemical and bacteriological investigations for local authorities and others.

Sir William Smith enjoyed something of an international reputation, which he owed mainly to the fact that his Institute made a practice of holding an annual conference, choosing commonly as the venue some university city outside the British Isles.

In addition to British medical and legal qualifications and honors, Sir William Smith had numerous foreign degrees, honors, orders, medals, and decorations of extreme brilliance conferred upon him. A man of great energy, he took part in a vast variety of work, and was a member of an infinity of public

bodies, sharing fully in all their activities up to the very day of his death at the age of 83.

Probably the Royal Institute of Public Health was his favorite concern, and as he was its moving spirit and was engaged in providing a new home for it when he died, there exists some uncertainty as to what the future is likely to be. To any who knew him it seems impossible to believe that anybody like him or able to fill his place will ever be found.

#### THE SEDGWICK MEMORIAL LECTURE

THE invitation to Dr. W. G. Savage, County Medical Officer of Health of Somerset, to deliver the Sedgwick Memorial Lecture for 1932 at Boston, has given very great pleasure here. Dr. Savage is one of the more prominent of the county medical officers of health in England, and has devoted very much more time than any of his colleagues to laboratory and research work.

It was while he was Medical Officer of Health of Colchester that he began this work with investigations into questions relating to food, and since then he has continued research in this direction, and has contributed very largely to the common stock of knowledge.

He has made a number of special investigations on behalf of the Ministry of Health with regard to bacterial food poisoning and such like subjects, and as an authority on milk—the county of Somerset being one of the milk producing counties—he is extremely well known.

At the moment he is not, I think, connected with any teaching institution, but he has held a number of special lectureships, and commonly, I believe, has chosen some subject having reference to food bacteriology and food poisoning.

London CHARLES PORTER, M.D.

# PUBLIC HEALTH ADMINISTRATION

**Diphtheria Prevention in New Jersey**—An attractive and interesting report has been issued of the 3-year state campaign for the prevention of diphtheria conducted by a committee representing the State Medical Society, the State Board of Health, the State Board of Education, the State Health Officers' Association, the Anti-tuberculosis League, and other organizations. The work was highly organized under a central executive council. A publication committee prepared lectures and passed upon literature used throughout the state. A press committee of representative newspaper men was chosen, and the use of these names on the news releases, which were periodically sent out from the distribution office of the committee assured a general use of the material.

Two major policies of the committee were that the campaign should be as far as possible guided by physicians, and should be conducted as largely as possible on a voluntary basis without the expenditure of large special funds appropriated or otherwise secured for the purpose. At least monthly meetings were held.

Among the activities were included the preparation of three standard lectures, to professional groups, to lay audiences, and for radio talks, and the use of 500, 24-sheet billboard posters of a diphtheria film trailer, of 5,000 attractive posters for doctors' offices, of monthly news articles, of a series of campaign letters, and of much other literature. Chairmen of 21 local committees were carefully selected medical men.

During the year following the organization of the committee, the State

Department of Health reported about 125,000 children immunized in public clinics. Thirteen counties reported 212,150 children immunized during the first 2 years, two counties indicating that 75 per cent and 77 per cent of their children respectively were protected. Sixty-nine lecturers gave 258 talks before a combined audience of 53,465 during this period.

It is noteworthy that during the third year, emphasis was placed on the protection of the preschool child. It was concluded that if the disease were to be eradicated by the protection of children before school entrance, it would be necessary to increase public clinic service or to secure a corresponding increase in the interest and participation of physicians in private practice. New literature and activities were developed in order to further personal education and contact with parents of preschool children in order to convince them of the need for this protection.—Three Year Report, Committee for the Prevention of Diphtheria, F. J. Osborne, Chairman, Health Officer, East Orange, N. J.

**Preventive Measures in Illinois**—The volume of preventive practice, in relation to the prevalence of certain diseases subject to control through vaccination and diagnosis by laboratory procedure, increased very noticeably in Illinois during 1931, according to statistics available from the State Department of Public Health.

The amount of toxoid and toxin-antitoxin distributed by the department indicates that 21 children were immunized against diphtheria for each case reported in 1931 against 16 to 1 in 1930

and 11 to 1 in 1929. For each case of smallpox 54 people were vaccinated in 1931 compared with 15 per case in 1930 and 21 per case in 1929. Against typhoid fever 20 people were vaccinated per case in 1931 compared with 21 per case in 1930 and 12 per case in 1929.

The diagnostic laboratories of the department examined for typhoid fever 13 specimens per case reported in 1931 compared with 9.5 per case in 1930. For diphtheria there were 2.5 specimens per case examined in 1931 compared with 1.4 per case in 1930. For tuberculosis the rate was 1.5 specimens per case in 1931 and 1.4 in 1930. For these three diseases 40,155 specimens were examined during 1931 against 35,984 although the aggregate number of cases reported declined from 18,997 in 1930 to 16,667.

Racine, Palo Alto, Milwaukee, and Detroit—The first four annual reports to be received for the calendar year 1931 are from these four cities, each of which was an honor city in the U. S. Chamber of Commerce Health Conservation Contest. These annual reports are not cluttered with long tiresome statistical reports but contain a few figures, sufficient to show the trend in mortality, morbidity, and birth rates, and present the reader with a clear conception of the type of service being rendered.

The death rates per 1,000 population were unusually low; 9.0 for Racine, 9.4 for Palo Alto, 9.1 for Milwaukee, and 8.8 for Detroit. The Health Commissioners ascribe the low rate to a number of circumstances, among which are the absence of epidemics of influenza and pneumonia; the favorable climatic conditions, with no extremes of heat or cold; the fact that people are leading more normal lives, indulging in simpler foods, securing longer hours of sleep, and relieved of some of the hazards of industry; and last but not least the fact that the programs of health education

are taking root and stimulate a responsive consciousness in the mind of the average citizen which has brought about a higher rate of protection against diphtheria and smallpox, a more frequent health examination, and more general practice of the simple regulations of personal hygiene.

The Health Commissioner of Milwaukee sounds a note of warning to the effect that although the tuberculosis death rate in each city has shown a marked decrease, there are many whose resistance has been lowered by worry and an inadequate food supply, and in the near years to follow this may result in a higher tuberculosis incidence. He feels that the foundation for an increase in the tuberculosis death rate of future years was laid in many homes during 1931.

In Detroit, in 1931, there were 13,403 deaths with a rate of 8.8, based upon an estimated loss in population of 70,000. Had the United States estimate of population been used, the death rate would have been even lower. This is the lowest rate in the history of the city. The birth rate was 18.6; the infant mortality rate 57.0; 47 per cent of births occurred in hospitals; 96.2 per cent of births were attended by physicians. Suicide and appendicitis for the first time appeared among the 10 principal causes of death, having taken the place of the acute communicable diseases and diarrhea and enteritis.

In Milwaukee, in 1931, there were 5,354 deaths. Had the rate of 1910 continued, there would have occurred 7,500 deaths. The yearly saving over the rate of 1920 is 1,505 lives. The infant death rate was identical with that of Detroit, 57.0. It is noted that there were 624 non-resident deaths in the city compared to 872 resident deaths outside of the city. Apparently tuberculosis cases are being hospitalized outside of the city limits as there were 22 more resident deaths from tuberculosis out-

side of the city than the average number for the 5 previous years.

In Palo Alto, there were 136 deaths, a rate of 9.4; there were 148 new babies with only 2 deaths, an infant mortality rate of 13.5.

In Palo Alto, there were reported but 2 cases of diphtheria with no deaths. In Milwaukee the incidence of this disease continues to decrease, there being 126 cases reported with 11 deaths. Detroit also saw a new low mark for diphtheria with 96 deaths or a rate of 6.3 which is less than one-third of the average for the preceding 5 years. Practically all communicable diseases showed new low records in Detroit. The typhoid death rate was less than 1; the tuberculosis death rate was reduced by more than 10 per cent over the preceding year; there were only 2 deaths from measles and a new low rate was established for scarlet fever. In Milwaukee, there were but 11 cases and 2 deaths from typhoid fever, a rate of 0.34.

Medical participation and coöperation continue to be the keynote of progress. In Detroit, all diphtheria preventive work has been continued through the agency of the family physician, resulting in protection to approximately 70 per cent of the children between the ages of 6 months and 10 years. Medical participation has been extended into the tuberculosis program with the establishment of a case-finding plan. A group of coöperating dentists has also been established. In Milwaukee, the medical profession has worked in close coöperation with the Health Commissioner.

There were two absorbing new interests in the Racine Health Department: first, the Health Department moved into its new and commodious quarters; and second, with the coöperation of the County Medical Society, a new program was undertaken to reduce the maternal mortality. In Racine, particular emphasis has been laid upon the educa-

tional features of health work. The Health Commissioner has been very active in radio broadcasting and has worked out unique methods of presenting his material in the form of dramatic episodes. The infant mortality rate was 36.2 per 1,000, the lowest that the city has ever experienced. The diphtheria death rate was 4.4, which is the same as for the preceding year.

These health department reports are to be commended for their simplicity, timeliness, and their general appeal to the serious minded citizen.

#### Serving the Small Community—

The 13th annual report of the Commonwealth Fund states that the major programs have one common characteristic in that they rely upon the interplay of selected social factors to accomplish ends which the exclusive use of a single approach would be less likely to attain. In public health work, the Fund is aiding in the work of the small general hospital, the rural public health unit, and the professional service of the rural physician.

Through the hospital, its function is broadly defined and its work is flexibly directed, a sheaf of educational influences can be brought to bear upon both physician and layman which, in the long run, may revolutionize the philosophy of rural medicine and the practice of community health.

Emphasis was given during the past year to better administration within the hospitals and to the development of plans for out-patient service. The 50-bed hospital is considered economically justified only if it is a compact unit, functioning smoothly with a small and well trained staff. In the 6 hospitals supported by the Fund, the increase in average occupancy during the year was 12 per cent—from 21.2 to 23.8, against a theoretical maximum of 50. The experience of small hospitals indicates that an average occupancy of approximately 35 would be normal for a 50-bed unit.

Direct educational activities associated with the hospital program—institutes for physicians and nurses, and postgraduate fellowships for physicians and dentists—were continued.

A fivefold program of rural medical service and rural health has been developed in which the small town general practitioner plays a central rôle. In the three states of Tennessee, Massachusetts, and Mississippi the activities were as follows:

1. Fellowships to enable rural physicians to do postgraduate work (15 to each state)
2. Provision for the strengthening of the teaching of preventive medicine in the undergraduate medical school
3. Scholarships to encourage the preparation of promising medical undergraduates for rural practice (5 to each state)
4. Intensive development, as a demonstration for other communities, of public health service on a county or town-union basis (2 units in each state)
5. State-wide advisory service, through a traveling unit of the state health department, in the development of rural public health service generally.

It is believed that a really progressive health department cannot reach its objectives unless the health officer thinks of himself, and the local physicians think of him, as a colleague of the general practitioner, specializing on certain forms of health service which involve communal action, and acting as a general consultant on the broadly educational phases of medicine. Through a division of health studies, efforts are being made to evaluate health work in terms of measurable results in separate fields of activity and to examine critically the evidences of progressive integration.—*Ann. Rep.*, Commonwealth Fund, 1931.

**Cincinnati Health Federation**—The chief concern of the Public Health Federation during 1931 was the mobilization of the health resources of the community to forestall, so far as might be, the probable ill effects of adverse

economic conditions. A minimum food budget was prepared with the help of physicians and nutritionists and distributed to all organizations caring for needy families. A second evaluation of the county health department activities was completed. A study was made of facilities for medical care of sick poor.

A joint committee of the Academy of Medicine, the Dental Society, the Better Business Bureau and the Federation has devoted itself to the task of trying to protect the public from fake and misleading medical advertising.

Assistance was given the Anti-Tuberculosis League in sponsoring a bond issue for the expansion and remodeling of the tuberculosis sanatorium. A cancer control council is made up of physicians and surgeons, dentists, nurses, health educators, and lay people.

A campaign of education is carried on through the medium of the newspapers, the radio and lectures to various clubs and societies. Comprehensive reports of several other public health councils indicate the broad scope of work of the Federation.—*Fourteenth Ann. Rep.*, Public Health Federation and its Councils, Cincinnati.

**Maternal and Child Welfare Work by the Public Authorities, Germany: Prussia**—The last annual report of the Ministry of Public Welfare of Prussia for 1929 gives an account of the maternal and child health work done in that country by the government. The report discusses the work of 348 prenatal health centers in that country for the examination of expectant mothers. Almost 19,000 women were examined in Berlin alone in the last fiscal year; one-fifth of them showed pathological conditions, but with repeated examinations it was possible to improve their health and to prevent complications. The majority of municipalities and rural communities provide financial aid in cases of poverty, in addition to the maternity

benefits paid under the federal laws. About 3,700 infant health centers were maintained with public funds, and they reached about two-thirds of the 700,000 children born annually in Prussia. A larger proportion of children are cared for at the centers in the cities than in the rural districts.

In many cities the work of the infant health centers extends to children of preschool age; in other cities special centers are provided for such children. About 400,000 children were reached by the centers reporting to the Ministry of Social Welfare. The public authorities also maintain large numbers of kindergartens and other arrangements for children of preschool age, such as day centers, rest homes in cities and in the country, clinics for ultra-violet ray treatments, and lunch rooms.

According to the report the health work extends to a larger proportion of school children—3,000,000 out of 3,600,000—than to children of other ages. Almost 3,200 school physicians and 4,600 school nurses were employed in the last year. Dental service has been given in the great majority of public schools; of the nearly 2,000,000 children whose teeth were examined in 1929, 44 per cent were found to be in need of treatment. School lunches were served to half a million children in about one-fifth of the public schools in Prussia. The municipal authorities are also maintaining a large number of rest homes and vacation homes for school children, and more than 600,000 children were thus accommodated in 1929.—*Archiv. f. Soziale Hygiene und Demographie*, Berlin, Vol. 6 (Sept.), 1931.

## LABORATORY

### A MODIFIED CELLOBIOSE BROTH FOR THE DIFFERENTIATION OF *B. COLI* AND *B. AEROGENES*

JOHN E. DOWD

*Assistant Director, Pease Laboratories, Inc., New York, N. Y.*

CELLOBIOSE was first proposed as a medium for the differentiation of *B. coli* and *B. aerogenes* by Jones and Wise<sup>1</sup> in 1926, and was very carefully correlated with other mediums by Koser.<sup>2</sup> It was later used by Lewis and Pittman<sup>3</sup> and by Perry<sup>4</sup> and probably others.

The authors of the method, Jones and Wise, used this sugar in a concentration of 0.5 per cent in a broth containing 0.3 per cent Difco beef extract and 1 per cent Difco peptone. It was sterilized in an autoclave for 20 minutes at approximately 121° C. They do not

tell how acid production was determined.

Koser, in his study of the method, added 0.5 per cent of cellobiose to a standard meat extract, peptone medium, plus 0.5 per cent agar, plus bromthymol-blue (pH range 6.0 to 7.6) in the amount suggested by Baker<sup>5</sup> (12 c.c. of a 0.2 per cent alcohol solution per liter). It was put into small tubes, in 2 to 3 c.c. amounts, and sterilized in an autoclave. This made a soft agar which was inoculated by stabbing with a straight wire. Gas production was detected by the torn appearance of the



agar medium and acid formation by the change in the indicator, brom-thymol-blue (blue to yellow). Incubation was at 30° C. for 48 hours as a routine procedure.

Lewis and Pittman employed Koser's method. Perry used the same soft agar method and, to a limited extent, broth fermentation tubes. The concentration of cellobiose used was 0.5 per cent and brom-thymol-blue was employed as an indicator for acid formation. A 4-day incubation at 37° C. was used. He says of it: "The cellobiose test has been found the most satisfactory single test for this purpose" (differentiation of *B. coli* and *B. aerogenes*).

In the method here reported the medium used was a standard sugar-free broth containing 0.3 per cent of beef extract and 0.5 per cent of peptone (Armour's bacteriological). To each 100 c.c. of this broth was added 0.25 gm. of cellobiose (Difco) and for an indicator of acid formation, 0.875 c.c. of a 0.05 per cent solution of brom-cresol purple (pH range 5.2 to 6.8). It was tubed in very small fermentation tubes and sterilized in an Arnold sterilizer, 45 minutes on 3 successive days. (The experience of Jones and Wise and Koser indicates that it can safely be autoclaved.) The regular inner tubes (8 mm. inside diameter) of the Dunham fermentation vials were used as the outer tubes. For inner tubes, glass tubing of about 5 mm. outside diameter was cut into 3/8" lengths and these sealed at one end. One c.c. is sufficient medium for one of these fermentation tubes.

In the first trial of this medium a concentration of 0.5 per cent of cellobiose was used. In a later batch a concentration of 0.25 per cent was accidentally employed and as the lot of medium apparently worked just as well, this concentration was adopted. (It was stated by the authors of the method that a lower concentration of the sugar might prove equally satisfactory.)

TABLE I  
CORRELATION OF CELLOBIOSE TEST WITH OTHER  
MEDIUMS AND METHODS FOR THE DIFFER-  
ENTIATION OF *B. COLI* AND *B. AEROGENES*

Culture	37° C. Incubation			46° C. Incubation
	Cellobiose Broth		Koser's Citrate Broth	Eijkman's Dextrose Peptone Broth Gas Formation
	Acid Formation	Gas Formation		
<i>Group I—Typical B. Coli from Feces Freshly Isolated</i>				
1. McAllister T <sub>1</sub> .....	—	—	—	5%
2. " T <sub>2</sub> .....	—	—	—	5%
3. Griggs T.....	—	—	—	10%
4. Abell T <sub>1</sub> .....	—	—	—	10%
5. " T <sub>2</sub> .....	—	—	—	10%
6. Ornsbee T.....	—	—	—	20%
7. Hoffman T <sub>1</sub> ...	—	—	—	10%
8. " T <sub>2</sub> ...	—	—	—	5%
9. " T <sub>3</sub> ...	—	—	—	—
<i>Group II—Atypical B. Coli not Freshly Isolated</i>				
10. No. 2.....	—	—	—	20%
11. No. 3.....	—	—	—	30%
12. No. 4.....	—	—	—	5%
13. No. 5.....	—	—	—	10%
<i>Group III—B. Aerogenes</i>				
14. No. 1.....	+	50%	+	—
15. No. 2.....	+	10%	+	—
16. No. 3.....	+	75%	+	—
17. No. 5.....	+	50%	+	—
18. No. 11.....	+	50%	+	—
<i>Group IV—Irrregular or Intermediate Forms</i>				
19. Sewage E....	+	Trace only	+	—
20. Sewage F....	+	—	—	—
21. Feces—Montgomery....	—	—	+	—

It has been employed many times as a differentiating medium in studying the growths on Levine's Eosin Methylene Blue Agar, transfers being made by means of a straight wire from separate colonies on the plate. Incubation is at 37° C. Acid and gas formation with *B. aerogenes* is rapid, easy to observe, and frequently positive in 24 hours. In 48 hours the results are usually final. In only a very few cases were the results indeterminate, that is, acid + and gas — or acid — and gas +.

It was found to work with great uniformity of results on pure cultures of *B. coli* and *B. aerogenes* freshly isolated from feces. A few correlations were made with Koser's citrate and with Eijkman's dextrose broth at 46° C. incubation. The accompanying table shows a selected list of these results. There are included a few that do not show perfect correlation. They indicate quite definitely that this medium may be depended upon to give results that are in line with those found by Koser and others.

At \$6.00 per gm. for cellobiose the cost for this constituent is only \$.015 per tube. With a reduction in the price of this sugar in the market, which may reasonably be expected, this obstacle in the way of its more general use would be removed.

#### SUMMARY

The cellobiose broth of the authors, Jones and Wise, has been modified by the reduction of the concentration of cellobiose to 0.25 per cent and the addition of brom-cresol purple as an indicator. The cost has been reduced by tubing in micro tubes that require only

1 c.c. for filling. Gas and acid formation are rapid and definite and sufficient correlation study has been made to indicate that the same results are obtainable as those found by Koser, who noted excellent correlation in the case of the two well defined sections of the group, with several other differentiating mediums, particularly with citrate broth, and also with the known source of the culture.

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## PREPARATION OF MEDIUM FOR THE CULTURE OF BACTERIUM TULARENSE

R. E. DANIELS

*Division of Laboratories, Ohio Department of Health, Columbus, O.*

LABORATORY workers have experienced some difficulty in growing *B. tularense*. This is especially true when the organism is cultured on a large scale for the preparation of antigen where the addition of blood to the medium is undesirable.

The following method of preparing the medium has proved satisfactory in the laboratory. The ingredients pres-

ent and the quantities used are those recommended by Francis, but the method of preparation has been modified somewhat.

Beef infusion broth is prepared in the usual manner with the addition of 1 per cent peptone and 0.5 per cent NaCl. This is titrated and the reaction adjusted to pH 7.3. The broth is then sterilized for 15 minutes at 15 lb. pres-

sure, cooled, filtered and titrated again. Any needed correction in reaction is made and the broth again sterilized at 15 lb. for 10 minutes. It is then titrated a third time and the reaction again corrected to pH 7.3 if necessary. With each sterilization the change in reaction becomes progressively less and often no correction is necessary after the third titration.

It was found that subsequent sterilization did not change the reaction and that additional titrations of the medium were therefore unnecessary. It is this drift toward the acid phase which, if left uncorrected, probably accounts for more failures in the culture of *B. tularensis* than any other one factor. While this method is suggested for *B. tularensis*, it should be equally applicable to any organism that has similar requirements of a definite and constant pH value.

After the third titration and correction, 2 per cent agar, 1 per cent dextrose and 0.1 per cent pulverized cystine

are added to the broth. The medium is distributed into large bottles or into test tubes, depending on whether it is to be used for stock cultures or for growing the organism for antigen. The medium is then given a final sterilization at 15 lb. for 20 minutes.

For antigen production we use 1 liter prescription bottles, adding 150 c.c. of the medium to each bottle. For stock cultures rabbit blood is added to the tubes under aseptic conditions.

The agar in the large bottle is agitated just before it is cool enough to solidify. This is desirable, as the cystine, being insoluble, settles out with any precipitate which may form during sterilization. Each bottle is placed on its flat side and allowed to solidify. The flat surface thus exposed is inoculated in the usual way. *B. tularensis* grows on this medium with an odor resembling freshly cooked meat. Any sour or musty odor is in itself proof of contamination even before it is confirmed by stained preparations.

# VITAL STATISTICS

## ACCIDENT CLASSIFICATION PROBLEMS IN NEW YORK STATE

EDMUND SCHREINER

*Assistant Director, Division of Vital Statistics, State Department of Health,  
Albany, N. Y.*

AS the New York State Health Department reports contain data for the entire state it was necessary, upon adoption of the last revision of the *International Classification of Causes of Death*, that this department and New York City employ a common code. New York City had been tabulating in detail statistics of fatal accidents—especially transportation accidents. Since they wished to continue, we agreed to code the following types: accidents in mines and quarries, by machinery, or by means of transportation without reference to the *International List* and to present these deaths in a supplemental table under the numbers used therein.

It is quite simple to code "machinery," "mines and quarries," and "transportation" accidents, but to classify the same by the International number presents a question—whether to code as a "crushing accident" (No. 186) or "other accidents" (No. 194). New York City Health Department assigns most automobile accidents, where a fracture is involved, to "crushing" (No. 186), but the U. S. Bureau of the

Census informs us such cases should be coded under Title 194 unless crushing is definitely stated. This department desires to agree with the Census, but our figures should be comparable with those of New York City.

A death certificate, covering an automobile accident, seldom specifies "crushing," but in many instances states fracture of portions of the body, and, when death results from overturning or collision with another vehicle or pedestrian, "crushing" is a logical conclusion.

Old No. 185 (falls) and old No. 188 (accidental traumatism by other crushing) would be comparable to new No. 186 only if most transportation accidents were included therein. Of 928 accidental deaths in the first 6 months of 1931, we assigned 837, or 90 per cent, to Title 186.

The question to be settled is: Where no definite statement of "crushing" appears on the certificate, or where it cannot be obviously deduced, should vehicular accidental deaths with fractures be assigned to No. 186 or No. 194?

## VITAL STATISTICIANS AND THE SAFETY MOVEMENT

R. L. FORNEY

*Statistician, National Safety Council, Chicago, Ill.*

THE safety movement recognizes that made real progress in the past few years  
registrars of vital statistics have in the collection of data on accidental

deaths. Only one state is now missing from the registration area; death reporting in the registration states is becoming more complete; the new standard death certificate provides for more information on accidental deaths; and the new *International List of Causes of Death* shows great improvement in the accident classifications.

Vital statisticians, however, are just on the threshold of helping and influencing the safety movement. The work done so far is fundamental and basic. The plans have been made and the foundations laid. Now, the time has come to start building the information that those interested in accident prevention need so badly, and which is available from no other source. The United States and Canadian registrars should develop this information with 3 things in mind: uniformity, simplicity, and timeliness.

We have uniformity, of course, in the accident classifications of the *International List*. In addition to this we must also have uniformity of definition for industrial, home, and public accidents.

In mentioning simplicity I have in mind that there is need for a simple one-dimensional classification of accidental deaths which, with cross classification by age, can be shown on a single sheet, which will be intelligible to the ordinary person, and will contain the essential data about accidental deaths. Such a sheet is being given you in connection with this paper. On the reverse side of the form, also shown, are the definitions of industrial, home, and public accidents. Certain registrars have been preparing a form approximately like this for several years—Alabama, Kansas, North Dakota, New York, Ohio, Missouri, and perhaps others.

The third element of a useful reporting procedure is timeliness. Many state health departments now issue monthly bulletins; the U. S. Bureau of

the Census has current releases on automobile accidents and other items. Vital statistics should provide a running record of mortality information which will guide the day-to-day and month-to-month efforts in behalf of health and safety. To accomplish this purpose it is desirable that this meeting go on record as favoring the preparation of a report of this kind monthly by the state registrars.

The principal purpose of such a summary would be to arouse and maintain interest within the state. In most states we find safety councils, women's clubs, schools, etc., all interested in accident prevention from a state-wide point of view. These organizations would appreciate the efforts of the state registrar in preparing the information; and the influence and prestige of the health department would be enhanced by such services. Such summaries could also be collected from the various states and summaries could be prepared that would have national significance.

#### ACCIDENTS SIXTH IMPORTANT CAUSE OF DEATH

It is unnecessary to stress the importance of the accident problem. In the country as a whole, accidents are the sixth most important cause of death. In some of the states represented here they lead the list, and among others are in second or third place. Among men accidents are the second most important cause of death in the entire country. Among children from 5 to 14, accidents cause twice as many deaths as any disease. The safety movement, therefore, appeals to vital statisticians on sure grounds.

Public health officials have a real responsibility in the safety movement, and the first and fundamental thing they can do is to obtain and summarize the facts about accidental deaths, and then present them to the public on a uniform, simple, and timely basis.

(Send one copy of this report to the National Safety Council, Inc., 20 N. Wacker Drive, Chicago)

Accidental Death Summary for ..... Month of ..... 193 .  
(City, County, State)

	Type of Accident	All Ages (A)	0-4 (B)	5-14 (C)	15-64 (D)	65 and Over (E)
	1. Grand Total.....					
Industrial	2. INDUSTRIAL TOTAL.....					
	3. Agriculture.....					
	4. Mining and Quarrying.....					
	5. Other Extractive Industries.....					
	6. Manufacturing.....					
	7. Construction.....					
	8. Transportation and Public Utilities.....					
	9. Trade.....					
	10. Clerical and Professional Service.....					
	11. Other Occupational Accidents.....					
Home	12. HOME TOTAL.....					
	13. Falls.....					
	14. Burns, Scalds and Explosions.....					
	15. Asphyxiation and Suffocation.....					
	16. Firearms.....					
	17. Poisons.....					
	18. Other Home Accidents.....					
Public	19. MOTOR VEHICLE TOTAL.....					
	20. Collision with Pedestrian.....					
	21. Collision with Other Motor Vehicle.....					
	22. Collision with R. R. Train.....					
	23. Collision with Electric Car.....					
	24. Collision with Bicycle.....					
	25. Collision with Horse Drawn Vehicle.....					
	26. Collision with Fixed Object.....					
	27. Non-Collision.....					
	28. PUBLIC (NOT MOTOR VEHICLE) TOTAL.. (Priority given to items 29 to 33)					
	29. Railroad—Not with Motor Vehicle:...					
	30. Street Car—Not with Motor Vehicle...					
	31. Other Vehicle—Not with Motor Vehicle					
	32. Water Transportation.....					
	33. Air Transportation.....					
	34. Falls.....					
	35. Burns, Scalds and Explosions.....					
	36. Drowning.....					
	37. Firearms.....					
	38. Other Public Accidents.....					

Important!

(Fill in blanks)

In addition to the.....motor vehicle deaths in public places, shown above, there were.....fatalities involving motor vehicles in homes and work places, making a grand total of.....motor vehicle deaths. Of this grand total, .....were of persons gainfully employed at the time of the accident.

(Please see reverse side for Instructions and Definitions)

National Safety Council, Gen. Stix, 1, 12-31-2M

REVERSE OF FORM

INSTRUCTIONS

For cities this report is intended to cover all deaths that result from accidents occurring in the city. Deaths in the city that result from accidents occurring outside should not be included. But deaths occurring outside the city as a result of accidents within the city should be included.

For states the report should cover all accidental deaths occurring in the state regardless of where the accident occurred. The exceptions noted above for cities are less important for states and should therefore be disregarded.

In either cities or states THE INFORMATION NECESSARY TO COMPLETE THIS REPORT CAN BE OBTAINED ONLY FROM THE RECORDS OF THE REGISTRAR OF VITAL STATISTICS. Police departments or others who can expect to get complete information on traffic accidents only will be supplied with a different form, on request to the National Safety Council, Inc., 20 N. Wacker Drive, Chicago. The traffic accident form provides for a detailed analysis of fatal, non-fatal, and property damage accidents and their circumstances.

DEFINITIONS

A. INDUSTRIAL ACCIDENTS.  
This classification includes all accidents arising out of and in the course of gainful employment unless injured person was a domestic servant; or was operating, riding in, or struck by a land, air, or water vehicle. However, when such a vehicular accident occurs in a railroad shop or yards, or other industrial work place not open to the public, it remains in the industrial classification.

B. HOME ACCIDENTS.  
This classification includes all accidents occurring wholly within domestic premises (within the building, lot or apartment lines of any domicile) except when the injured person was a gainfully employed person other than a domestic servant.

C. PUBLIC ACCIDENTS.  
This classification includes all accidents other than those described in Sections A and B. This group of public accidents is separated into two parts: (a) Accidents involving a motor vehicle; (b) Accidents not involving a motor vehicle.

This Report Prepared by:  
Name .....  
Title .....  
Department .....  
Address correspondence to .....

KEEPING THE PUBLIC INTERESTED IN ACCIDENT DATA

EARLE G. BROWN, M. D., F. A. P. H. A.

*Secretary, Kansas State Board of Health, Topeka, Kans.*

THE Kansas State Board of Health during the past 3 years has made a special study into the cause and also the possibilities of the prevention of accidental deaths. The reason for this study was the definite increase from year to year in the number of accidental deaths which occurred in the state. In the past 6 years, in only one have accidental deaths been less than 6 per cent of the total, and in 1930, 8.3 per cent of the 19,583 deaths were charged to external causes.

The old form of standard death certificate did not provide for any informa-

tion in regard to deaths from external violence. The new form provides for the inclusion of this, if the questions are answered on the certificate. If these questions are answered on all such deaths, it is possible to classify them as to the place of origin and the type of accident. The new standard form does not allow for the inclusion of some of the data which our department is collecting.

We have found six principal sources for the distribution of material in regard to accidents and their prevention: (1) the press, (2) the radio, (3) safety

speakers, (4) city and county health officers, (5) safety chairmen of the American Legion, and (6) safety directors of various types of utilities and industries.

The newspapers have made liberal use of accident material prepared by the State Board of Health. Thirteen summaries were prepared on accidental deaths in 1930, and received wide distribution through the public press.

Our department has available the service of a broadcasting station for a 7-minute broadcast each week. During the past 5 months we have prepared and had broadcast, with an estimated

audience of 4,000,000 persons, 4 papers on fatal accidents reported during 1930. As a response, we have received a request from a utility company for a copy of one of these in order that it might be mimeographed and distributed to the employees of this company, which operates in 9 states.

The public is interested in accident prevention and will give careful consideration to material which is prepared and presented in an attractive manner.

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NOTE: These three abstracts are of papers read at the Special Session on Accidents of the Vital Statistics Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 16, 1931.

## PUBLIC HEALTH ENGINEERING

### MODERN METHODS OF RODENT CONTROL

C. K. STEWART

*Director of Rodent Control, Health Department, Los Angeles, Calif.*

LOS ANGELES is a modern city and appreciates its responsibility to the world commerce that enters its harbor. It created some years ago the Division of Rodent Control as a part of the city's Health Department. Mindful of the losses that many cities of the world have suffered from rodent-borne diseases, in times past, Los Angeles wages a constant warfare against all rodents. The Division of Rodent Control is now functioning with a personnel of 13 inspectors, trained in the habits of rodents and capable of prompt and intelligent action at the right time.

In a city of 1½ million, and comprising 465 square miles of territory, the task of eliminating the rodent population is indeed a difficult one. In addition to depleting their number approximately 5,000 per month, this division maintains a monthly index, ever

holding itself in readiness as an efficient nucleus of a larger, adequate force in the event of an emergency. If a department of health is to protect and safeguard the public properly, it must maintain such a unit. This applies especially to seaport cities where vessels arrive from all parts of the world.

This division has succeeded, since its inception to the close of the fiscal year for 1931, in capturing 159,522 rats; 60,297 mice, and 8,295 ground squirrels, demonstrating conclusively the correctness of the extermination methods adopted. These rodents are tagged, showing species, sex, and the address where picked up, and promptly delivered to the rodent laboratory, where they are subjected to various tests to determine if they are capable of conveying any contagious disease. No estimate is made or even attempted of



the great number of rats and squirrels destroyed by the distribution of poison baits and the use of carbon bisulphide. In addition to trapping, poisoning, and shooting of rats and squirrels, and with a view to better sanitary conditions in and practical rat-proof construction of all food establishments, personnel of this division inspect all such food depots and pass on them, before permits are issued.

The work of a rodent control unit of any health department, having at its front door a world harbor with a cargo movement of \$100,000,000 a year, and maintaining a water front of 25 miles, must be expedited by using the latest approved scientific methods. Control work at the harbor is handled by inspectors quite as astute as the rodents themselves, for with vessels arriving from world ports, even a bandicoot may be expected to escape from one of these ships and find its way ashore. Under existing ordinances coastwise shipping does not come under rigid inspection, excepting when a vessel arrives from a known plague or suspected plague port. Ships from foreign ports are met upon arrival, day or night, by inspectors whose duty it is to see that all lines leading from ship to shore are equipped with approved rat guards; that gang planks are lighted when not in use; and that all crated, burlap wrapped cargo is inspected and the consignees' addresses are forwarded to the office in order that the shipments can be inspected at the time of uncrating or unpacking.

Thanks to modern construction, the wharves at the harbor are built of concrete and the buildings are practically rat-proof, thus facilitating the work of rodent control to a marked degree.

In the eradication work the wharves and a distance of 1 mile from the water front are spread with poison at least once a month, also a line of traps to catch any stray rats that might have

escaped from a vessel is kept constantly working under the wharves and in the warehouses. This service, together with the periodical flea survey and the monthly index, affords excellent protection.

The officials at the harbor are to be commended for their untiring efforts in aiding in this all-important work; they are most certainly anti-rat propagandists, and with their coöperation with the local office, rats are being kept to a minimum at this port.

The downtown business section of the city is divided into districts of approximately 4 square blocks, with 1 inspector in each district. He runs 300 official snap-traps daily to supply the laboratory with specimens and to keep up a monthly index of the migration of the rodent population. Scout trappers cover the outlying districts, answering all complaints from home owners, furnishing expert instructions on rat-proofing, rodent destruction, and abatement of rodent nuisances.

Much progress is being made in rodent destruction through coöperation with the Chamber of Commerce and other city departments. For example, the Building and Safety Department furnishes this division with the address of all buildings (at the time permit is requested) to be moved or demolished, thus enabling us to process them with poison baits, destroying all rodents therein, and preventing a spread to the surrounding buildings when these structures are removed to different locations or torn down.

Routine work in the control of ground squirrels entails poisoning, shooting and gassing of them throughout the outlying sections of the city, and is carried on by a squad of 4 inspectors. These men supply the laboratory with specimens and also furnish the material for an excellent ground squirrel index.

A close study of the flea index discloses the fact that fleas appear to be

more prevalent on the ground squirrels during the months of March and April of each year, some animals producing on combing from 30 to 75 fleas each, with *Ceratophyllus acutus* predominating.

In conclusion, it is believed that the work of this division affords the best means of blocking off the entry of rat-carried diseases, and thereby contributes its bit to the protection of the public health.

Los Angeles possesses anti-rodent laws in its General Sanitary Code, parts of which are herewith given:

*Sec. 43—Bakeries*—All floors, walls, ceilings, and entrances shall be so designed and constructed as to exclude rats, mice, vermin, flies, and other insects.

*Sec. 74—Par. B—Restaurants*—All floors, walls, ceilings, and entrances shall be so designed, constructed and maintained as to exclude rats, mice, flies, and other insects.

*Sec. 104—Meat Markets*—Every meat market or meat shop, and every room, building, or place in which meat, fish, game, poultry, or any product thereof is stored, held, kept, exposed or offered for sale for food for human consumption, or manufactured into articles of food for human consumption, shall be so constructed and maintained as to prevent any flies or other insects or any vermin or rodents from entering therein.

*Sec. 144—Par. C—Poultry Slaughter Houses*—The walls of any such room or place wherein any such rabbits, chickens, turkeys, ducks, geese, and other fowls are slaughtered

shall be constructed of cement or asphalt, or any such room or place shall be lined with metal to a height of 6 feet above the floor thereof.

*Sec. 208—Par. A—Food Sanitation*—The floors, walls, and ceilings of such places shall be well constructed of smooth, cleanable material and so designed, constructed, and maintained as to exclude rats, mice, vermin, flies, and other insects.

*Par. G*—All articles of food or ingredients thereof used in the manufacture, preparing or mixing of any kind of food products shall be kept thoroughly covered and protected against contamination of any sort, including dirt, dust, rodents, flies, and other insects.

*Par. I*—All portions of such buildings or premises, including yards, alleys, areaways, waterclosets, plumbing, dressing rooms, utensils, tables, equipment and parts thereof, shall be kept clean, sanitary, and free from dirt or accumulation of rubbish, garbage, refuse, or debris of any sort; suitable garbage and rubbish receptacles shall be provided and kept clean, covered, and in good condition.

*Sec. 356—General Sanitation*—No rubbish, waste or cast off materials of any kind shall be placed, left, dumped, or permitted to accumulate or remain in any building or place, or on any premises so that the same shall or may afford food or a harboring place for rodents. Every place, room or building where any article of food or products thereof is stored, held, kept, given away, exposed, or offered for sale for human or animal consumption shall be so constructed and/or maintained as to prevent rodents from entering therein and from harboring therein or thereunder. All buildings, places and premises shall be kept by the owner or agent in a clean and sanitary condition and free from rodents.

colorations, the degree being largely dependent upon the amount of oxygen present. So far as is known the enzymes are merely inactivated by freezing. These difficulties have led to studies of wrapping and packaging methods, whereby oxidative and other deteriorative changes are kept at a minimum. While it is true that rapidly frozen foods contain relatively small crystals immediately after freezing, it is not generally known that these grow during storage. This is particularly noticeable in brined products. Fluctuations in temperature are especially serious in this respect and may cause considerable loss in quality. The temperature must therefore be under delicate control and maintained at about 10° F. or lower.

Transportation is another problem not yet fully worked out. Balsa wood, or thick waxed corrugated fiber board cartons, lined with moisture proof paper and heat sealed, serve as excellent insulators and are extensively used for shipping products which do not contain much free juice. Such containers will keep the contents in good condition for 3 to 4 days. Refrigerated cars are used for long distance shipments. Carbon dioxide ice has been used during transit and is very effective. It is also used to keep retail purchases of frozen food in good condition for several hours. Greater care is necessary with frozen plant products than with flesh foods because enzymic action, breakdown and leakage begin at lower temperatures in the former. In any case the consuming public should have assurance that the freezing, storage, and transportation are effective and under control, and that frozen foods offered for sale have not been previously thawed.

#### EFFECT ON NUTRITIVE VALUES

Freezing *per se* has little effect on the nutritive properties of foods. The relation of leakage or "drip" to physical changes has already been discussed.

Richardson and Scherubel,<sup>2</sup> in 1908, were among the first to find that very little chemical change occurs in frozen meats. Their findings have been amply verified by C. S. Smith,<sup>3</sup> Clark, Almy and Pennington,<sup>4</sup> and Almy and Field.<sup>5</sup> Taylor<sup>6</sup> and Birdseye<sup>10,20</sup> studied the effects of freezing on animal and plant tissues and concluded that the only significant changes which occur are histological and physical, and these can be largely eliminated by the use of suitable processes and equipment.

The investigations of Birdseye,<sup>10,20</sup> Taylor,<sup>6</sup> Woodroof,<sup>11</sup> British Food Investigation Board,<sup>12</sup> The Council for Scientific and Industrial Research in Australia,<sup>13</sup> Joslyn,<sup>14</sup> Classen,<sup>15</sup> Low Temperature Experiment Station, Cambridge, England,<sup>16</sup> Diehl and others<sup>17,18</sup> have proved

the feasibility of freezing a wide range of foods with retention of good quality, flavor and eye-appeal. The conditions of packing, suitability of varieties or species, proper storage temperatures, and effect of thawing have been studied. If the juices of frozen foods are retained and eaten, there would appear to be no loss in valuable extractives. The darkening and oxidative changes which occasionally occur are of importance principally because they affect appearance and palatability. Very little research has been conducted on the nutritive value of frozen foods. Vitamins A, B, and D are uninjured by freezing.<sup>20, 21</sup> The fate of vitamin C after thawing is more uncertain, especially when stored for long periods of time. Delf<sup>21</sup> working with orange juice, and Bracewell, West and Zilva<sup>22</sup> with apples, found little loss resulted from freezing storage. Our own studies<sup>23</sup> on cranberries indicate a considerable loss when held in air at 10° F. for a year. Much research is needed on the effect of freezing and storage on the vitamins. It seems likely that some losses in vitamin C would occur, should defrosted fruits and juices stand for any considerable time.

#### EFFECT ON MICROORGANISMS

Very little information is available on the number and character of the microorganisms in frozen foods. The writer recently made some determinations, shown in Table I. Except in the case of fish and beef, which were brine frozen at 10° F., the other foods were frozen in air at —10° F. in sealed tin cans. Examinations were made after approximately 12 months in freezing storage at 10° F. Good quality fresh products were used for these experiments. The original bacterial count was not taken.

Presumptive tests for *B. coli* made for each sample were all negative. Corn, peas, and beans yielded cultures resembling *B. aerogenes* and *B. cloacae*. Many pinpoint colonies were present on the plates made from the peas and corn after thawing. The varieties of bacteria were relatively few. Though not carefully counted, molds were fully as numerous as bacteria in the fruits, but the standard methods agar is not a particularly favorable medium for molds. Yeasts were present in moderate numbers. Irish and Joslyn<sup>24</sup> have demonstrated the resistance of yeasts to freezing storage. Fruits packed with sugar had fewest organisms of all. Upon thawing, the greatest increase occurred in the fruit frozen without sugar. Except for a little surface discoloration, the sugar packs were in good condition after 36 hours, while fermentation and surface molding were observed in all samples not containing sugar.

Though the initial bacterial population of the frozen vegetables and

TABLE I

MICROÖRGANISMS IN FROZEN FRUITS, VEGETABLES AND OYSTERS, AND IN THE SAME FOODS AFTER STORAGE FOR 24 HOURS AT 70° F.

Product	Bacteria per gram Frozen	Anaerobes in 10 grams	Bacteria per gram after storage 24 hrs. at 70° F.	Anaerobes after 24 hrs.	Odor
Raspberries—with sugar 3 : 1	3,000	—	8,000	+	good
Raspberries—cardboard box	270,000	+	3,600,000	+	"
Raspberries—cardboard box	8,000	—	850,000	—	"
Strawberries—cardboard box	10,000	—	27,000	—	"
Strawberries—cardboard box	8,000	—	160,000	—	"
Strawberries—with sugar 2 : 1	200	—	2,000	—	"
Peaches—sliced, cardboard box	50	—	600	—	"
Peaches—sliced, with sugar 3 : 1	60	—	700	—	"
Cherries, sour pitted with sugar 3 : 1	0	—	20	—	"
Peas—blanched	8,000	+	29,000,000	+	sour
Peas—blanched	less than 1,000	—	24,000,000	+	"
Green beans blanched	less than 1,000	+	40,000,000	+	abnormal
Green beans blanched	2,000	—	30,000,000	+	sour
Sweet corn blanched	5,000	+	100,000,000	+	putrid
Sweet corn blanched	1,500	+	60,000,000	+	putrid
Carrots blanched	3,000	+	5,800,000	+	abnormal (no gas)
Carrots	less than 1,000	—	3,600,000	—	abnormal
Oysters	22,000	+	320,000,000	?	sour

oysters was small, a tremendous increase occurred within a very few hours after thawing. There was a loss of characteristic odor in about 6 hours, followed by souring and finally decomposition. Cocci, sporulating aerobes and a varied flora were present. The thawed vegetables and their juices make an excellent culture medium for bacteria, and unless held at very low temperatures soon spoil and become unfit for food. This is an important point which should be emphasized.

Frozen foods must be plainly labelled "Perishable," especially if sold in tin containers, so that the public will not treat them in the same way as the well known heat-canned foods. For this reason, it has been suggested that sealed tin cans be not used for frozen foods," but they have so many advantages that this is scarcely feasible. Aside from its convenience, air-tightness, and ability largely to eliminate oxidation and flavor losses, the sealed can swells or bulges when the contents spoil. As in heat-canned foods, this swelling will serve notice on the housewife that the contents are not safe to eat.

Under the anaerobic conditions existing in the sealed can, spores such as *Cl. botulinum*, if present, may readily develop and form toxin, particularly after thawing has begun. It is not believed that appreciable bacterial growth would occur in the very short time required to

freeze small packages; besides some oxygen is still present in evacuated cans for several days after sealing. The oxygen present in the tissues and in the interspaces of foods gradually combines with the metals of the can. Paper or cardboard cups and boxes are not airtight; hence danger from toxicogenic anaerobes probably is not present in foods frozen in this type of container.

Poultry is usually frozen whole. Fish may be frozen in the round, dressed, or boned and filleted. The latter method has found decided favor with the housekeeper. Meats are also being extensively retailed in wrapped, attractive packages. Though extensively consumed for a great many years, no serious outbreaks of disease or illness have been proved to be caused by frozen meats, fish, or poultry. They are packed in small paper boxes and often wrapped with cellophane. So long as the packages are kept frozen no difficulty need be anticipated, but upon thawing, leakage and decomposition may occur.

A few data (Table II) were obtained on the bacterial content of frozen fish, poultry, and beef, (1) after having been frozen a year, and (2) after thawing for 24 hrs. at 70° F. The products were wrapped in waxed paper and packed in small paper boxes holding about 1 lb. Freezing was carried out at -10° F., and storage at 10° F.

TABLE II

BACTERIA IN FROZEN MEAT, POULTRY AND FISH AND IN THE SAME FOODS AFTER STORAGE AT 70° F. FOR 24 HOURS

Product	Bacteria per gram Frozen	Anaerobes per 10 grams Frozen	Bacteria per gram after 24 hrs. at 70° F.	Anaerobes Thawed 24 hrs.	Odor
Beef Steak	390	—	1,400,000	—	sl. abnormal
Pork Chops	1,300	—	8,700,000	+	sl. sour
Haddock	38,000	—	770,000	—	normal except slight NH <sub>3</sub> odor
Salmon *	20,000	—	330,000	—	lack of fresh odor
Whole chicken (breast)	0	—	30	—	fresh
Eggs (in tin can)	190,000	+	70,000,000	+	sour, tainted odor

\* The salmon had been previously frozen.

After defrosting for 24 hours, the eggs were of poor quality bacteriologically; the meats, fish, and chicken were excellent. They also kept better following exposure to high temperatures than fruits or vegetables. The bacteria present in the meats, haddock, and salmon were mainly Gram-positive cocci, fluorescens types, achromobacter and flavobacter of several types. The flora was entirely different from that found on vegetables. The absence of anaerobes is notable.

presumptive tests for *B. coli* were negative, though closely allied species were present.

These data indicate that if good quality raw products are used freezing will preserve the food perfectly for a long time.

That the original bacterial content of fresh fish and probably of other foods is greatly reduced by freezing, has been shown by Birdseye,<sup>1</sup> Pease,<sup>2</sup> and Green.<sup>3</sup> Aside from the few results published by Birdseye,<sup>1</sup> no report was found bearing on the multiplication of microorganisms in frozen foods after thawing. Researches should be conducted on this important point. It is important that we know how long the various frozen foods can be kept at various temperatures before becoming unsafe or unfit to eat.

### SUMMARY

Frozen food factories are clean and modern methods of sanitation are used in preparing the many perishables now packed. The quality of the raw product is high and if the freezing is prompt and rapid, and the storage kept at low, constant temperatures, little or no deterioration in quality, appearance or nutritive value occurs. Several types of very efficient mechanical equipment are available to carry out the freezing process.

Fish, meats, poultry, eggs, and oysters are especially well preserved by freezing because they retain more nearly their fresh appearance, flavor, and character than fruits or vegetables. Most fruits are best when frozen with sugar and in this form retain their flavor very well. Vegetables are the most recent addition to the list of frozen foods. Though some varieties freeze very well, others do not. Both fruits and vegetables bleed freely on thawing. Spoilage occurs very quickly in vegetables after defrosting. More research is urgently required on the microbiology of frozen flesh foods and vegetables.

Little change occurs in the chemical, enzymic, or nutritive properties as a result of freezing. The changes are largely physical. Freezing greatly reduces the number of microorganisms present in foods, and prevents their multiplication. Emphasis must be placed on the prompt utilization of frozen foods. Until more is known about the subject, frozen products should be consumed while still frozen or within a very few hours after defrosting.

The ready availability of a large variety of frozen foods at all seasons will serve to give variety and balance to the human diet and should aid in decreasing nutritional deficiency diseases. The future of the industry is bright.

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## Air Ambulances in Siam

A NOVEL feature of the health work in Siam is the air-ambulance service. Owing to lack of highways, the usual means of transport is the bullock cart. As this method is too slow for patients requiring urgent medical treatment, the government has arranged that the regular mail-service airplanes shall also carry sick persons, physicians, and medical supplies. Persons unable to pay are carried free of charge; for others there is a fixed mileage rate. Medical supplies for combating epidemics are transported free.

Siam now has nine Red Cross health centers, three of which are in Bangkok, where the first center was opened in 1923, according to the London *Mother and Child*. This Far-Eastern country, whose progressive absolute ruler recently visited the United States, also has a school, opened in 1925, which offers a 6-month course in public health nursing and midwifery to graduate nurses.—U. S. Children's Bureau, Washington, D. C.



# A Statistical Study in Maternal Mortality\*

E. S. MACPHAIL, F. A. P. H. A.

*Chief, Division of Census and Vital Statistics, Dominion Bureau of Statistics,  
Ottawa, Canada*

IT is a truism that the underlying object in compiling vital statistics should be as an aid in the protection and permanency of the community. They are not compiled merely to satisfy idle curiosity or to bolster some pet theory. Vital statistics, like all statistics, are not worth the time and money spent on them if the usefulness of the facts disclosed does not serve the State.

In the preparation of the material for the present paper a somewhat new line of approach to the important subject of maternal mortality was followed, namely, to treat it from a more or less purely statistical viewpoint. In looking over the reports of Annual Meetings of this Association within the last few years we find nearly a score of papers dealing with various phases of this subject, but nearly all were given before the Child Hygiene Section and we have no quarrel with the manner or place of presentation. It may further be remarked that in no instance did these papers deal with the purely statistical aspects of the subject.

In an endeavor to approach the subject from an angle which had not been so thoroughly explored it was thought that interesting and illuminating statistical results might be got by relating the maternal death certificates with the birth certificates corresponding to the event which terminated fatally for the mother, and when the record was dubious or insufficient by making supplementary inquiries to ascertain whether a birth had taken place. The reason that a reference had to be made to the birth certificates was that the mortality certificate did not show whether the death was associated with a birth or not. Therefore not having the necessary information to classify the death according to the kind of birth on the mortality certificate it became necessary to consult the birth certificate to ascertain whether the maternal death was associated with a live birth, a stillbirth or no birth. This investigation yielded some interesting discoveries, not the least of which was that of 70 deaths credited to "abortion," 13 of them were found to have been associated with a live birth and 7 with a stillbirth. The ex-

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planation of these apparently contradictory assignments may be found in the too wide use of the term "abortion" as a cause of death by the physicians certifying. In each case the medical certificate gave the cause of death as "abortion," while our later search for the special purposes of this paper revealed the existence of a certificate for a live birth or a stillbirth.

Although the task promised to be tedious, yet, because of the interest presently evinced in maternal mortality and its associated phenomena, it appeared well worth the trouble to link wherever possible the maternal death with the birth certificate referring to the same event. The investigation was started first with the certificates for 1926, but the figures for that year being less detailed and less carefully investigated have not been used in this paper. For 1927 and 1928 the investigation was conducted in as thoroughgoing a fashion as the data available and the circumstances would permit, and it is with the results for these two years combined that this study deals.

It may be well to define some of the terms used.

1. *Birth*—The minimum period of gestation for which we knowingly accept a birth certificate in our statistics has been 6 months.

2. *Live Birth*—The criterion of a live birth has been respiration after complete birth, that is, after the complete extrusion of the fetus from the body of the mother.

3. *Stillbirth*—The child which has not breathed after complete birth is classed as stillborn.

4. *No Birth*—This term, as used in the tables herewith, includes cases of "abortion," "ectopic gestation," etc., and also those in which the woman was not delivered.

With regard to the definitions given of a "birth" and a "live birth," we apply the foregoing rules whenever the certificate contains the information which allows their use, though in many cases we have nothing to go on except the mere fact of registration as a "live birth" or "stillbirth."

Throughout this paper rates are computed on several different bases according to the purpose in view. For example, the rates for all puerperal deaths, regardless of their association with a birth or otherwise, are computed in the usual manner by their proportion to live births. Rates will also be found for maternal deaths associated with live births and stillbirths separately or with both combined, computed in each case on the number of live births or stillbirths or the aggregate of both as the case may be. In general, births are taken instead of confinements, the consequent difference in the rate being insignificant. In the comparison of deaths associated with single and multiple births, however, the rates are based on confinements. It is evident that no rate can be computed separately for those deaths not associated with

a birth, as we have not, and can probably never hope to have, a figure for the total number of pregnancies.

It will also be recognized that the results of an investigation of this sort, covering a country as extensive as Canada, with such varied conditions, climatic, economic, and social, and with a population comprising several racial stocks, is apt to contain biases due to unknown facts which may affect the classifications as well as the results. To take one example, as shown in Tables XII and XIII, the women reported with the 4th, 5th or 6th birth between the ages 25 and 30 are not likely to be representative of the various racial groups in the same proportion as those reported with their first birth at this age.

Table I shows that of the total of 1,300 deaths from puerperal causes in 1927, 642, or 49 per cent, were associated with a live birth, 256, or 20 per cent, with a stillbirth and 402, or 31 per cent, were not associated with either a live birth or a stillbirth. In 1928 the total number of deaths was 1,331 of which 636, or 48 per cent, were assigned to a live birth, 254, or 19 per cent, to a stillbirth, while the remaining deaths, reported as not being associated with a birth, numbered 441, or 33 per cent of the total. For the aggregate of the 2 years the deaths associated with a live birth were 49 per cent of the total, and with a stillbirth 19 per cent, while 32 per cent were associated with "no birth" as previously defined.

The death rate, calculated in the usual manner from the proportion of maternal deaths to the number of live births, was 5.6 in each of the years 1927 and 1928. If only those deaths associated with either a live birth or a stillbirth are considered, their proportion to the number of live births and stillbirths combined was 3.7 per 1,000 in 1927 and

TABLE I

DEATHS FROM PUERPERAL CAUSES ASSOCIATED WITH LIVE BIRTH, STILLBIRTH OR NO BIRTH,  
CANADA, 1927 AND 1928 (COMBINED)

Year	No. of deaths from puerperal causes				Death rates from puerperal causes			
	Total	Associated with			All deaths per 1,000 live births	Associated with live birth or stillbirth	Associated with live birth	Associated with stillbirth
		Live birth	Still-birth	No birth		Per 1,000 births	Per 1,000 live births	Per 1,000 stillbirths
1927.....	1,300	642	256	402	5.6	3.7	2.7	34.9
1928.....	1,331	636	254	441	5.6	3.6	2.7	33.5
Two years	2,631	1,278	510	843	5.6	3.7	2.7	34.2

TABLE II

DEATHS FROM PUERPERAL CAUSES ASSOCIATED WITH LIVE BIRTH, STILLBIRTH OR NO BIRTH,  
BY PROVINCES, 1927 AND 1928 (COMBINED)

Provinces	No. of deaths from puerperal causes				Death rate from puerperal causes			
	Total	Associated with			Total per 1,000 live births	Associ- ated with live birth or stillbirth	Associ- ated with live birth	Associ- ated with stillbirth
		Live birth	Still- birth	No birth		Per 1,000 births	Per 1,000 live births	Per 1,000 still- births
Canada.....	2,631	1,278	510	843	5.6	3.7	2.7	34.2
Prince Edward Island..	15	10	1	4	4.3	3.1	2.9	11.5
Nova Scotia.....	133	72	26	35	6.0	4.3	3.3	36.4
New Brunswick.....	123	69	25	29	6.0	4.5	3.4	45.5
Quebec.....	847	417	163	267	5.1	3.3	2.5	36.7
Ontario.....	799	359	168	272	5.9	3.7	2.6	30.3
Manitoba.....	146	71	24	51	5.1	3.2	2.5	25.4
Saskatchewan.....	238	125	42	71	5.6	3.8	3.0	38.0
Alberta.....	201	100	41	60	6.6	4.5	3.3	44.9
British Columbia.....	129	55	20	54	6.3	3.6	2.7	32.7

3.6 in 1928. If on the other hand the deaths associated with live births are taken in proportion to the number of live births, and those associated with stillbirths in proportion to the number of stillbirths, the difference is very striking. Deaths associated with live births gave a rate of 2.7 per 1,000 for both 1927 and 1928, while those associated with stillbirths a rate of 35 per 1,000 in 1927 and 33.5 in 1928. This comparison of the rates for deaths associated with a live birth and of those associated with a stillbirth illustrates the recognized fact that in combating the prenatal conditions which result in a maternal death we are at the same time assisting in effecting a reduction in the number of children born dead.

In Table II the aggregate maternal mortality of each province for 1927 and 1928 combined is similarly presented under the same 3 divisions: Deaths associated with a live birth; deaths associated with a stillbirth; those cases in which "*no birth*" took place.

A discussion of the results of such an investigation by provinces would be too detailed for the purposes of this paper; furthermore the figures for the smaller provinces, particularly for Prince Edward Island, are not sufficiently large to give reliable results. It is noted, however, that the proportion of puerperal deaths not associated with a birth

TABLE III

DEATHS FROM SPECIFIED PUERPERAL CAUSES ASSOCIATED WITH LIVE BIRTH, STILLBIRTH OR NO BIRTH, CANADA, 1927 AND 1928 (COMBINED)

Int. List No.	Cause of death	Total	Associated with		
			Live birth	Still- birth	No birth
	All puerperal causes	2,631	1,278	510	843
143...	Accidents of pregnancy	203	20	13	170
144...	Puerperal hemorrhage	356	175	135	46
145...	Other accidents of labor	275	118	72	85
146...	Puerperal septicemia	887	516	88	283
147...	Puerperal phlegmasia alba dolens, puerperal embolism, sudden death in puerperium	171	117	24	30
148...	Puerperal albuminuria and convulsions	640	261	160	219
149...	Following childbirth (not otherwise defined)	97	69	18	10
150...	Puerperal diseases of the breast	2	2	—	—

varied from 24 per cent in New Brunswick to 42 per cent in British Columbia.

In every province the rate for deaths associated with stillbirths is much higher than for those associated with live births, ranging generally from 10 to 15 times as high, when the rate for each of the 2 classes is computed on its appropriate denominator.

Table III gives the deaths associated with a live birth, a stillbirth, or no birth, classified according to the cause of death; and Table IV shows the proportional distribution of the deaths from each cause among these 3 categories.

TABLE IV

PROPORTION OF DEATHS FROM SPECIFIED PUERPERAL CAUSES WHICH WAS ASSOCIATED WITH LIVE BIRTH, STILLBIRTH OR NO BIRTH, CANADA, 1927 AND 1928 (COMBINED)

Int. List No.	Cause of death	Total	Associated with		
			Live birth	Still- birth	No birth
	All puerperal causes	1,000	486	194	320
143...	Accidents of pregnancy	1,000	98	64	837
144...	Puerperal hemorrhage	1,000	492	379	129
145...	Other accidents of labor	1,000	429	262	309
146...	Puerperal septicemia	1,000	582	99	319
147...	Puerperal phlegmasia alba dolens, puerperal embolism, sudden death in puerperium	1,000	684	140	175
148...	Puerperal albuminuria and convulsions	1,000	408	250	342
149...	Following childbirth (not otherwise defined)	1,000	711	186	103
150...	Puerperal diseases of the breast	1,000	1,000	—	—

Table IV exhibits for certain causes interesting variations in the proportion of deaths associated with a live birth, a stillbirth, or no birth. For instance, 49 per cent of the women who died from puerperal hemorrhage had a child born alive, while in 38 per cent the child was stillborn, and in 13 per cent there was no birth. For other accidents of labor the percentage of live births was 43, stillbirths 26, and no birth 31. The proportion of deaths from puerperal septicemia associated with a live birth was high, 58 per cent, while only 10 per cent were associated with a stillbirth; but deaths with no birth amounted to 32 per cent, evidence of the part which abortions play in swelling the total deaths from this cause. Deaths from phlegmasia alba dolens and embolism were associated with live births to a high degree, 68 per cent, while in only 17.5 per cent no birth took place. Where puerperal albuminuria and convulsions were the cause of death, live births were reported for 41 per cent, stillbirths 25 per cent, and no birth 34 per cent.

Table V gives the death rates per 10,000 births from each cause, column 1 covering all deaths and basing the rates on the proportion to live births after the usual manner; column 2 gives the proportion of deaths associated with live births to the total of live births and column 3 the deaths associated with stillbirths. It will be observed by a comparison of columns 2 and 3 that the proportion of the rate for deaths

TABLE V

DEATH RATES FROM SPECIFIED PUERPERAL CAUSES, AND RATES FOR DEATHS ASSOCIATED WITH LIVE BIRTH OR STILLBIRTH BASED ON NUMBER OF LIVE BIRTHS OR STILLBIRTHS, CANADA, 1927 AND 1928 (COMBINED)

Int. List No.	Cause of death	All deaths	Deaths asso- ciated with live birth	Deaths asso- ciated with stillbirth
		Rate per 10,000 live births	Rate per 10,000 live births	Rate per 10,000 stillbirths
	All puerperal causes	56	27	342
143...	Accidents of pregnancy	4	(1)	9
144...	Puerperal hemorrhage	8	4	91
145...	Other accidents of labor	6	3	48
146...	Puerperal septicemia	19	11	59
147...	Puerperal phlegmasia alba dolens, puerperal embolism, sudden death in puerperium	4	2	16
148...	Puerperal albuminuria and convulsions	14	6	107
149...	Following childbirth (not otherwise defined)	2	1	12
150...	Puerperal diseases of the breast	(1)	(1)	—

1. Rate less than 1 per 10,000 live births

TABLE VI

TOTAL DEATHS FROM SPECIFIED PUERPERAL CAUSES, CLASSIFIED AS INSTITUTIONAL AND NON-INSTITUTIONAL, CANADA, 1927 AND 1928 (COMBINED)

Int. List No.	Cause of death	Number of deaths			Rate per 10,000 live births		
		Total	Institu- tional	Non- institu- tional	Total	Institu- tional	Non- institu- tional
	All puerperal causes	2,631	1,256	1,375	56	131	37
143...	Accidents of pregnancy	203	110	93	4	11	2
144...	Puerperal hemorrhage	356	108	248	8	11	7
145...	Other accidents of labor	275	146	129	6	15	3
146...	Puerperal septicemia	887	498	389	19	52	10
147...	Puerperal phlegmasia alba dolens, puerperal embolism, sudden death in puerperium	171	59	112	4	6	3
148	Puerperal albuminuria and convul- sions	640	312	328	14	32	9
149	Following childbirth (not other- wise defined)	97	23	74	2	2	2
150 ..	Puerperal diseases of the breast	2	—	2	(1)	—	(1)

1. Rate less than 1 per 10,000 live births

associated with stillbirths to that for deaths associated with live births is particularly heavy in connection with puerperal hemorrhage, other accidents of labor, and puerperal albuminuria and convulsions, and comparatively light for puerperal septicemia and phlegmasia alba dolens and embolism.

Table VI divides deaths according as they took place inside or outside an institution. The rates have been calculated for each cause based on 10,000 live births. Almost throughout the list of causes the institutional death rates are much higher than non-institutional. Such a comparison must be made with reservations, as in many instances hospitalization has taken place only when the outlook for a successful termination was doubtful. This appears to have happened in many cases where a death has been classified to "Accidents of Pregnancy," which investigation showed to have been incidental to an abortion *extra mural* in origin. Similar considerations apply to the rate for puerperal septicemia which for institutions was over 5 times as high as the non-institutional rate. Other causes also show an apparent bias against institutions.

To make a fairer comparison, Table VII takes in only those deaths which were associated with live births and compares the rates by causes as between institutional and non-institutional deaths. Even here it must be remembered that in many cases the woman may have been

TABLE VII

DEATHS FROM SPECIFIED PUERPERAL CAUSES ASSOCIATED WITH A LIVE BIRTH, CLASSIFIED AS INSTITUTIONAL AND NON-INSTITUTIONAL, CANADA, 1927 AND 1928 (COMBINED)

Int. List No.	Cause of death	Number of deaths			Rate per 10,000 live births		
		Total	Institutional	Non-institutional	Total	Institutional	Non-institutional
	All puerperal causes	1,278	536	742	27	56	20
143...	Accidents of pregnancy	20	6	14	(1)	1	(1)
144...	Puerperal hemorrhage	175	45	130	4	5	3
145...	Other accidents of labor	118	60	58	3	6	2
146...	Puerperal septicemia	516	252	264	11	26	7
147...	Puerperal phlegmasia alba dolens, puerperal embolism, sudden death in puerperium	117	40	77	2	4	2
148...	Puerperal albuminuria and convulsions	261	120	141	6	12	4
149...	Following childbirth (not otherwise defined)	69	13	56	1	1	1
150...	Puerperal diseases of the breast	2	—	2	(1)	—	(1)

1. Rate less than 1 per 10,000 live births

TABLE VIII

INSTITUTIONAL AND NON-INSTITUTIONAL BIRTHS FOR CERTAIN TYPICAL OCCUPATIONS OF FATHERS, CANADA, 1929

Occupation of father	Numerical distribution			Per cent distribution		
	Total	Institutional	Non-institutional	Total	Institutional	Non-institutional
All occupations.....	242,981	60,349	182,632	100.0	24.8	75.2
Owners, managers, etc.....	1,850	771	1,079	100.0	41.7	58.3
Professional workers.....	5,298	2,988	2,310	100.0	56.4	43.6
Office employees (including government and municipal)	7,913	3,841	4,072	100.0	48.5	51.5
Laborers, agriculture.....	1,055	198	857	100.0	18.8	81.2
" other.....	40,191	5,230	34,961	100.0	13.0	87.0
Farmers.....	75,155	11,383	63,772	100.0	15.1	84.9
Fishermen.....	2,824	196	2,628	100.0	6.9	93.1
Shantymen.....	1,312	407	905	100.0	31.0	69.0
Miners and quarrymen.....	4,089	976	3,113	100.0	23.9	76.1
Manufacturing employees...	27,739	8,249	19,490	100.0	29.7	70.3
Building trades.....	15,938	3,758	12,180	100.0	23.6	76.4
Steam railway employees...	4,916	1,799	3,117	100.0	36.6	63.4
Electric railway employees..	868	214	654	100.0	24.7	75.3
Chauffeurs, drivers, etc.....	7,625	2,189	5,436	100.0	28.7	71.3
Salesmen in stores, etc.....	4,781	2,626	2,155	100.0	54.9	45.1
Other occupations.....	33,380	11,116	22,264	100.0	33.3	66.7
Occupation not given.....	7,726	4,306	3,420	100.0	55.7	44.3
No occupation.....	321	102	219	100.0	31.8	68.2



brought to the institution owing to a serious condition following a birth outside. There is also a probability that the confinements in institutions included an undue proportion of cases in which some serious condition indicated the advisability of hospitalization.

The disparity between the rates for institutional and non-institutional deaths, while still existing in a fairly marked degree, has been greatly lessened by the inclusion only of deaths associated with live births. The rate for all causes combined, 3.5 times as great for institutions when all puerperal deaths were considered, is only 2.8 times as great when the comparison is limited to deaths associated with live births. In deaths from "Other Accidents of Labor," in which the proportion was 5 to 1 in the former case, it is only 3 to 1 in the latter. For puerperal septicemia it has been reduced from more than 5 to 1 to less than 4 to 1.

In Table VIII a digression has been made to illustrate hospitalization in relation to occupation of father. In comparing institutional with non-institutional rates it should be remembered that women whose confinement occurs in institutions are not proportionately representative of all classes in the community. A tabulation of institutional and

TABLE IX

MATERNAL DEATHS ASSOCIATED WITH A LIVE BIRTH OR A STILLBIRTH, CLASSIFIED ACCORDING TO PERIOD ELAPSING BETWEEN BIRTH OF CHILD AND DEATH OF MOTHER, CANADA, 1927 AND 1928 (COMBINED)  
(Absolute figures)

Int. List No	Cause of death	Total	Under 1 day	1 day and under 1 week	1 week and under 2 weeks	2 weeks and under 3 weeks	3 weeks and under 1 month	1 month and under 3 months	3 months and under 6 months	6 months and over	Period not known
113..	All puerperal causes	1,789	480	462	310	132	94	82	7	3	219
144..	Accidents of pregnancy	34	12	8	4	2	1	—	—	—	7
145..	Puerperal hemorrhage	310	179	44	15	5	5	—	—	1	61
146..	Other accidents of labor	190	60	81	13	5	2	3	1	—	25
147..	Puerperal septicemia	604	20	116	193	78	61	52	5	—	79
148..	Puerperal phlegmasia alba dolens, puerperal embolism, sudden death in puerperium	141	41	21	28	18	10	9	—	1	13
149..	Puerperal albuminuria and convulsions	421	143	167	43	15	12	10	1	—	30
150..	Following childbirth (not otherwise defined)	87	25	25	14	9	3	6	—	1	4
	Puerperal diseases of the breast	2	—	—	—	—	—	2	—	—	—

TABLE X

MATERNAL DEATHS ASSOCIATED WITH A LIVE BIRTH OR A STILLBIRTH, CLASSIFIED ACCORDING TO PERIOD ELAPSING BETWEEN BIRTH OF CHILD AND DEATH OF MOTHER, CANADA, 1927 AND 1928 (COMBINED)

(Per cent distribution)

Int. List No.	Cause of death	Total	Under 1 day	1 day and under 1 week	1 week and under 2 weeks	2 weeks and under 3 weeks	3 weeks and under 1 month	1 month and under 3 months	3 months and under 6 months	6 months and over
		Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
143..	All puerperal causes	100.0	30.6	29.4	19.7	8.4	6.0	5.2	0.4	0.2
144..	Accidents of pregnancy	100.0	44.4	29.6	14.8	7.4	3.7	—	—	—
145..	Puerperal hemorrhage	100.0	71.9	17.7	6.0	2.0	2.0	—	—	0.4
146..	Other accidents of labor	100.0	36.4	49.1	7.9	3.0	1.2	1.8	0.6	—
147..	Puerperal septicemia	100.0	3.8	22.1	36.8	14.9	11.6	9.9	1.0	—
148..	Puerperal phlegmasia alba dolens, puerperal embolism, sudden death in puerperium	100.0	32.0	16.4	21.9	14.1	7.8	7.0	—	0.8
149..	Puerperal albuminuria in convulsions	100.0	36.6	42.7	11.0	3.8	3.1	2.6	0.3	—
150..	Following childbirth (not otherwise defined)	100.0	30.1	30.1	16.9	10.8	3.6	7.2	—	1.2
	Puerperal diseases of the breast	100.0	—	—	—	—	—	100.0	—	—

non-institutional births for certain typical occupations of the father, made for the year 1929, illustrates this point (Table VIII). It may be assumed that the years 1927 and 1928 would show similar differences between the various occupations in regard to the proportion of births occurring in institutions. A very small proportion of the children of fishermen, farmers and laborers were born in institutions. On the other hand, the proportion was high for professional workers, salesmen in stores, office employees, and owners and managers, these ranking in the order named. The births for which the occupation of the father was not given were nearly all to unmarried mothers. The proportion of these occurring in institutions was high.

Table VIII should not be accepted as furnishing conclusive evidence on hospitalization, but will accomplish a useful purpose if it stimulates further investigation.

In Table IX the puerperal deaths associated with live births or stillbirths have been classified by causes and by the time elapsing between the birth and the mother's death. Table X gives the corre-

TABLE XI

PUERPERAL DEATHS OF MARRIED MOTHERS ASSOCIATED WITH A LIVE BIRTH OR A STILLBIRTH, BY AGE OF MOTHER AND ORDER OF BIRTH, CANADA, 1927 AND 1928 (COMBINED)

(Absolute figures)

Age of mother	All births	Order of birth						
		1st child	2d child	3d child	4th to 6th child	7th to 9th child	10th child or higher order	Order of birth not known
All ages.....	1,731	458	195	146	332	222	207	171
Under 20 years.....	70	54	8	3	1	—	—	4
20-24 ".....	310	162	62	26	32	2	—	26
25-29 ".....	363	107	51	49	94	22	1	39
30-34 ".....	374	74	34	29	105	72	22	38
35-39 ".....	373	41	32	24	69	86	91	30
40-44 ".....	213	17	8	12	28	35	83	30
45 years and over....	28	3	—	3	3	5	10	4

sponding per cent distribution by elapsed periods. In all some 31 per cent of the deaths occurred within 24 hours after delivery. The percentage should be somewhat higher, as in those cases where the mother's death took place the day after the birth and no information as to the number of hours was available, it was assumed that 1 day had elapsed. Sixty per cent of the deaths occurred within 1 week, roughly 20 per cent in the 2d week, and the remainder were scattered over longer periods with less than 1 per cent taking place more than 3 months after the birth.

Of the deaths from puerperal hemorrhage, 72 per cent occurred on the 1st day, while only 4 per cent due to puerperal septicemia took place within this period, and 11 per cent more than a month after the birth. Deaths from puerperal albuminuria and convulsions occurred on the 1st day in some 37 per cent of the cases and within 1 week in 79 per cent.

Table XI classifies the puerperal deaths of married mothers which were associated with a live birth or a stillbirth according to the order of the birth in conjunction with the age of the mother. A presentation of Birth Statistics in the Canadian Annual Reports, from which the required figures for the age of mother and order of birth of the child have been extracted to form Table XII, has made it possible to present the rates for each category in Table XIII. The rates for very young mothers for higher orders of birth and those for mothers near the upper limit of the childbearing ages for lower orders are naturally based on a comparatively small number of births, and may be con-

TABLE XII

BIRTHS (INCLUDING STILLBIRTHS) TO MARRIED MOTHERS, BY AGE OF MOTHER AND ORDER OF BIRTH, CANADA, 1927 AND 1928 (COMBINED)

Age of mother	All births	Order of birth						
		1st child	2d child	3d child	4th to 6th child	7th to 9th child	10th child or higher order	Order of birth not stated
All ages.....	471,229	101,719	82,774	65,343	124,796	58,961	36,947	689
Under 20 years....	23,602	17,745	4,841	861	150	—	—	5
20-24 " ....	111,875	46,198	33,293	18,553	13,308	466	28	29
25-29 " ....	127,400	24,380	25,824	23,514	44,463	8,520	667	32
30-34 " ....	102,142	9,094	12,699	14,229	38,163	21,992	5,932	33
35-39 " ....	72,727	3,223	4,847	6,537	21,894	20,158	16,045	23
40-44 " ....	28,920	771	1,084	1,426	6,139	7,020	12,469	11
45 years and over .	3,150	62	62	105	475	694	1,750	2
Age not stated....	1,413	246	124	118	204	111	56	554

sidered as not forming a typical cross-section of the married women of these ages. Rates which for these reasons were considered unreliable have therefore been omitted, and others which, although included, are based on fewer than 2,000 births are indicated by a footnote.

The lowest mortality rates for all orders of birth combined are for mothers between the 20th and 30th birthdays, with 2.8 maternal deaths per 1,000 births. Mothers under 20 show somewhat higher rates, and

TABLE XIII

PUERPERAL DEATHS OF MARRIED MOTHERS ASSOCIATED WITH A LIVE BIRTH OR A STILLBIRTH, BY AGE OF MOTHER AND ORDER OF BIRTH, CANADA, 1927 AND 1928 (COMBINED)

(Rate per 1,000 births)

Age of mother	All births	Order of birth					
		1st child	2d child	3d child	4th to 6th child	7th to 9th child	10th child or higher order
All ages.....	3.7	4.6	2.6	2.5	3.1	4.5	6.2
Under 20 years.....	3.0	3.0	2.3	(1)	(1)	—	—
20-24 " ....	2.8	3.6	2.1	1.7	3.2	(1)	—
25-29 " ....	2.8	4.6	2.3	2.4	2.5	3.1	(1)
30-34 " ....	3.7	8.1	2.9	2.3	3.1	3.9	4.0
35-39 " ....	5.1	12.7	6.6	3.7	3.5	5.0	6.1
40-44 " ....	7.4	22.0 (2)	7.4 (2)	9.1 (2)	6.0	6.3	7.5
45 years and over.....	8.9	(1)	—	(1)	(1)	(2) 8.6	(2) 7.4

1. Rates not computed on account of smallness of numbers involved
2. Rates based on fewer than 2,000 births

each 5-year age group above 30 shows an increase as compared with the group below it until a rate of 8.9 per 1,000 is reached for mothers 45 and over.

For primiparae the lowest rate is 3.0 per 1,000 for mothers under 20. The rates for 1st births mount with each increase in age until a figure of 22 per 1,000 is reached for women between the 40th and 45th birthdays. This last rate is based on fewer than 2,000 births.

For the 2d and 3d child, women between the 20th and 25th birthdays have the lowest rates, 2.1 and 1.7 per 1,000 respectively. For the 2d child the rate for mothers under 20 is the same as for those between the 25th and 30th birthdays. For both of these orders of birth the rates show a general tendency to increase with the advancing age of the mother, but the proportion of the rates near the upper limit of childbearing ages to the minimum rate is in each case less than for primiparae.

For the 4th, 5th and 6th children taken together, the lowest rate is found for mothers between the 25th and 30th birthdays. For the 7th, 8th and 9th children taken together, the first significant rate is for women 25 to 29, and the rate increases progressively from this group with the advancing age of the mother. The same tendency is manifest in the rates for the 10th child or higher order, for which the first significant rate and the lowest of those computed is for women between the 30th and 35th birthdays.

When order of birth is considered for the separate age groups, the rate for primiparae is in every case where listed much higher than for the other orders which have significant figures. For women between 20 and 35 the general tendency appears to be the approach to a minimum rate for the 3d child; for women between 35 and 45 the minimum rate is for the 4th, 5th and 6th children.

The lowest rate in the table is for women between the 20th and 25th birthday bearing the 3d child—1.7 per 1,000 births, based on 18,553 births.

To compare the risk in single and multiple confinements, the rate of maternal mortality has been computed for each of these classes with results as follows:

RATES FOR SINGLE AND MULTIPLE CONFINEMENTS

	Confinements	Deaths	Rate per 1,000
Single.....	473,832	1,719	3.6
Multiple.....	5,977	69	11.5
Total.....	479,809	1,788	3.7

Rate for multiple confinements is more than 3 times that for single.

Of the 1,789 deaths associated with live births or stillbirths, 884 were associated with male births, single or multiple, 792 with female births, 20 with twins or triplets of both sexes, and 93 sex not known. Taking only the 884 deaths associated with male births and the 792 associated with female births, and using male and female births respectively as denominator, we obtained rates of 3.5 and 3.4 per 1,000 respectively. Treating the deaths associated with live births separately, we obtained a rate of 2.4 with male births and 2.6 with female births. On the other hand, the deaths associated with stillbirths show a higher rate with male births than with female, the figures being 35.5 and 29.9 respectively.

In Table XIV, puerperal deaths have been listed according to the racial origin of the decedent and a rate for each origin calculated per 1,000 live births; also for deaths from puerperal septicemia. The deaths have been divided according to whether they were associated with a live birth, a stillbirth or no birth, and a percentage distribution based on these figures. Of the chief racial origins, the Scottish have a

TABLE XIV

MORTALITY FROM PUERPERAL CAUSES BY RACIAL ORIGIN, CANADA, 1927 AND 1928 (COMBINED)

Racial origin of decedent	All deaths from puer- peral causes		Deaths from puerperal septicemia		Deaths associated with				Per cent of deaths associated with		
	No.	Rate per 1,000 live births	No.	Rate Per 1,000 live births	Live birth		Still- birth No.	No birth No.	Live birth	Still- birth	No birth
					No.	Rate per 1,000 live births					
All origins.....	2,631	5.6	887	1.9	1,278	2.7	510	843	48.6	19.4	32.0
English.....	664	6.1	220	2.0	312	2.9	117	235	47.0	17.6	35.4
Irish.....	257	6.3	78	1.9	121	3.0	61	75	47.1	23.7	29.2
Scotch.....	308	6.6	92	2.0	134	2.9	65	109	43.5	21.1	35.4
French.....	921	4.9	315	1.7	470	2.5	183	268	51.0	19.9	29.1
Austrian....	24	8.1	14	4.7	12	4.0	2	10	50.0	8.3	41.7
Dutch.....	22	5.2	7	1.7	11	2.6	7	4	50.0	31.8	18.2
German.....	101	4.8	38	1.8	47	2.2	20	34	46.5	19.8	33.7
Indian.....	58	11.0	15	2.9	46	8.7	2	10	79.3	3.4	17.2
Italian.....	19	3.9	6	1.2	9	1.8	3	7	47.4	15.8	36.8
Jewish.....	13	3.2	5	1.2	4	1.0	3	6	30.8	23.1	46.2
Norwegian..	21	5.6	9	2.4	8	2.1	5	8	38.1	23.8	38.1
Polish.....	31	6.5	16	3.3	14	2.9	8	9	45.2	25.8	29.0
Russian.....	37	8.4	10	2.3	19	4.3	5	13	51.4	13.5	35.1
Swedish.....	17	6.2	5	1.8	12	4.4	1	4	70.6	5.9	23.5
Ukrainian...	53	4.9	20	1.9	25	2.3	12	16	47.2	22.6	30.2
Other origins	81	5.5	37	2.5	32	2.2	15	34	39.5	18.5	42.0
Not specified	4	1.4	—	—	2	0.7	1	1	50.0	25.0	25.0

death rate of 6.6 per 1,000 live births, Irish 6.3, English 6.1, and French 4.9, compared with the general death rate from puerperal causes of 5.6 per 1,000.

The highest death rate is for mothers of Indian origin, amounting to 11 per 1,000, though this rate is probably affected by the more incomplete registration of Indian births. Other high rates are for women of Russian and Austrian origin, while Ukrainians give 4.9 per 1,000, well below the average. The term "Austrian" is somewhat ambiguously used, and usually refers to Slavic people from the former Austro-Hungarian Empire or their descendants. There seems no particular reason why this description should be favored more on death than on birth certificates, but it might be safer to consider the rate for decedents of Russian, Austrian, and Ukrainian origins as one total. The rate thus calculated is 6.3 per 1,000.

Women of Jewish origin show the lowest death rate, 3.2 per 1,000, and are closely followed by Italian women with a rate of 3.9 per 1,000, each based on approximately 5,000 births. Both Jewish and Italian women show a very low death rate from puerperal septicemia. Only 37 per cent of the deaths of Italian women were not associated with a birth, as compared with 46 per cent for those of Jewish origin, a high figure for the latter when considered with their low death rate and particularly with the low rate from puerperal septicemia. The number of deaths is small, and for this reason the interpretation doubtful.

In spite of the high death rate of Indian women, only 17 per cent of the deaths were not associated with a birth.

In addition to the deaths which were assigned to puerperal causes, there were in the 2 years 439 deaths assigned to other causes, but for which the medical certificates or replies to inquiries made mention of a recent pregnancy or parturition. These 439 deaths would give a rate of 0.9 per 1,000 live births, and added to the 2,631 deaths directly attributed to puerperal causes, would make a total of 3,070 deaths of women associated with pregnancy or childbirth, a rate of 6.5 per 1,000 live births. Of these 222, or 51 per cent, were associated with a live birth, 63, or 14 per cent, with a stillbirth, and 154, or 35 per cent, no birth. The proportion of these deaths not associated with a birth, and that with a live birth, were slightly higher than in the case of deaths attributed directly to puerperal causes, while a considerably smaller percentage of them was associated with a stillbirth.

Among the 439 deaths were 14 resulting from criminal abortion. These are classified as homicides.

# The Montreal Water Supply\*

C. J. DESBAILLETS

*Chief Engineer, Montreal Water Board, Montreal, Canada*

IN the year 1800, The Montreal Aqueduct was formed and received a 50-years franchise for the installation of a gravity system situated near Côte-des-Neiges, consisting of a wooden cistern with spring water fed by a wooden pipe. Today Montreal has 1,250,000 inhabitants and the St. Lawrence River provides its water supply.

What has happened during this 131 years would be too long to enumerate, but it is interesting to note the successive additions, taking advantage of progress both in machinery, pipes, and aqueduct system in general. In 1920, Montreal, having approximately 1,000,000 population, was in possession of an aqueduct system, taking its water from the St. Lawrence River through a canal 7 miles long, and had for the main pumping station a steam plant composed of various units of different sizes and makes. This station required approximately 80 men to operate it.

An event at the end of 1919 precipitated a radical change, and today the whole water supply of Montreal is pumped through modern electrically driven pumping stations of various stages. The event referred to was a general strike of the employees of the Montreal Aqueduct, which took place on New Year's eve, 1919, when the temperature was 20 to 25° below zero F. The strike lasted approximately 3 days, and Montreal was only saved from calamity by the sporting spirit of the citizens of all classes and ranks who volunteered to operate the steam plants, thus, under terrific handicap, keeping the water supply uninterrupted.

Soon after this the Montreal Water Board was formed, with recommendation to establish for the city a modern aqueduct system which could be operated safely and efficiently with a minimum of men, so avoiding a repetition of the trouble experienced in the winter of 1919. It is this system that I will briefly describe.

As stated previously, the St. Lawrence River is the source of supply for this aqueduct, and through the gates of Lasalle Bridge, the water is

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delivered to the filtration plant by a canal approximately 7 miles long, 200 ft. wide, and 20 ft. deep. The reason for this large canal is that ultimately the city will develop power from it which will be used for various purposes by the municipal authorities.

A filtration plant is located on the south side of the canal on land belonging to the city, and in the territory of the municipality of Verdun. This plant consists of 3 batteries of rapid sand filters of 50 m.g.d. each, and 1 slow sand filter battery of the same capacity, so that it is possible to operate at a capacity of 200 m.g.d., though, at present, it is operated at the daily rate of approximately 125 m.g.d. The water is pumped by low lift pumps from the canal over the filter, as it was found more economical to do so, instead of depressing the filters to feed them by gravity through the canal and pump the wash water through the sewer system of the city.

A lateral conduit of 9 ft. diameter is also available and having its intake approximately 1,000 ft. from shore, is capable of delivering approximately 100 m.g.d. of St. Lawrence water proper, as the north shore of the St. Lawrence water adjacent to the canal carries more or less of a mixture of Ottawa and St. Lawrence water, which is different from the St. Lawrence water, strictly speaking. It has more color and less alkalinity, and would require ultimately treatment by coagulation. However, up to the present, and under the supervision of the Provincial Board of Health, it has not been found necessary to coagulate the water of the Montreal Aqueduct, but the problem has been studied and plans have been prepared for coagulation basins, alum mixing plant, etc., so that when the quality of water supply may be judged by the Board of Health to warrant such a measure, the structures, basins, etc., can be built to be operated in conjunction with the present filtration plant.

Up to the present, owing to the excellent nature of the river water, we are only filtering the water supply through the rapid sand filters and after chlorinating the filtered water, it is found to be safe and absolutely suitable for domestic purposes. It is seen, that under the present methods, with the cost of coagulation eliminated, the Montreal water supply is treated at very reasonable expense, and this aqueduct is one of the most economical to operate on this continent.

Leaving the filter, the water is stored in a 26 m.g. underground reservoir, located between the filtration plant and the pumping station. This reservoir acts as a stabilizer between the constant output of the low level pumping units and the intermittent and irregular flow of the filter plant. It is equipped with a structure called the depressed bay, by which the complete reservoir may be put out of service for repair or

disinfection, and the water supply restored to the low level pumps by means of the emergency conduit tapped directly into the canal, and through which chlorinated water can be obtained to feed all the pumps of the low level pumping station during the time the reservoir or filtration plant is out of commission.

Special features of this conduit in regard to baffle plants, separation, etc., allow perfect feed of each individual pump, as well as the possibility, even under ordinary operation, of access to the suction of each pump separately.

#### LOW LEVEL PUMPING STATION

Owing to the various elevations upon which Montreal is built, it has been found necessary to divide the city into three zones, namely, the low level, the high level, and the high pressure zone.

The low level district or zone is supplied through the low level pumping station, which pumps directly into the mains of this low level zone, and to the McTavish reservoir which acts upon the low level system as an accumulator in which the difference of the water between consumption and the pumpage is stored. This reservoir has a capacity of 48 m.g. and is located on the side of the mountain.

The low level pumping station, which pumps the total supply of water, consists of a building in which electrical equipment is installed to control and operate six 30 m.g.d. pumps, driven by electrical motors; the ultimate capacity of the station is twelve such pumps.

The Montreal Water Board is actually finishing plans and specifications for the enlargement of this station where three 30 m.g.d. pumps will be installed, bringing up the total of pumps to nine. This station is operated by electricity. The electrical energy is delivered by two transmission lines and a third stand-by line, all being connected to a high tension loop of a power company having 4 to 5 large hydro-electrical plants located in various parts of the province and connected to different sections of this loop. The capacity of such a loop is more than 250,000 kilowatts.

Owing to the disposition described, the low level pumping station has been in operation for over 10 years, and it has never been found necessary to utilize the steam turbo-generator plant at its disposal through the power contract between the city and the power company.

The transmission lines are subdivided at the entrance of the plant in six 3-phase cables, two of which are suitable for the total load. In every circuit breaker, bus-bars are installed in duplicate and all precautions have been taken for quick repair, to prevent careless starting of motors. With the centralized control equipment located on 2 bench

boards, 2 operators only are necessary to keep this main pumping station in operation. Special features of protection both electric and hydraulic have been included in the equipment and have made the operation of this station almost fool-proof.

#### DISTRIBUTION CONTROL BUILDING

The water pumped by the low level pumps is distributed by 3 headers of 72" diameter into a building called the distribution control. In this building six 48" mains are so interconnected that with 1 header alone in operation, all mains can be fed with water, and as all the valves controlling these mains, and transfer valves from one main to another, are located in this building and are electrically operated from the main bench board of the station, the transfer of water distribution which may be necessitated by break or accidents in town can be taken care of by the operator on the hydraulic bench board of the low level pumping station.

Owing to the severe cold prevailing in the winter in Montreal, it has been found preferable to locate main valves in well protected, heated buildings in order to gain quick access to them instead of outdoors in chambers located at suitable points.

The six 48" mains deliver the water to the various parts of the city and, as stated above, some of these mains deliver water to the McTavish reservoir, which serves also as a suction well for the six pumps of the McTavish Pumping Station, which are repumping the water to the high level zone, having as a stabilizer the Côte-des-Neiges reservoir, as well as the Peel Street reservoir, to act on the distribution mains of the high level zone in order to take care of the difference of water between the consumption and the pumpage at McTavish Pumping Station. This McTavish Pumping Station also repumps the water into the Outremont reservoir and Outremont district in the same manner as it pumps water in the Côte-des-Neiges reservoir.

As an additional explanation we must say that recently the City of Montreal has purchased the Montreal Water & Power company which operated an aqueduct system similar to, but smaller in size than the one of the city, and in order to limit the pumpage for the two aqueducts to the low level pumping station and McTavish Pumping Station, it was necessary to redesign somewhat the main piping of the Montreal Water and Power Company, in order to convey the water to its former reservoirs, namely, Côte-des-Neiges and Outremont, by means of the McTavish reservoir and the new McTavish Pumping Station which take care of these services. Previously, the Peel Street reservoir was the only one acting upon the city high level zone, but now through

new connections the Côte-des-Neiges reservoir will take the place of the Peel Street reservoir, adding storage capacity to the system as well as increasing its pressure by approximately 20 lbs.

#### MCTAVISH PUMPING STATION

The McTavish Pumping Station has been recently constructed and is just being put in operation. It consists of three 12 m.g.d. pumps repumping water from the McTavish reservoir into the Côte-des-Neiges reservoir and three 15 m.g. pumping units repumping water from the McTavish reservoir into the Outremont reservoir. These six pumps are located in one room. They have been designed in such a way as to be all interchangeable, as regards to bearings, shafts, and bed plates, but not impellers because of the different characteristics of the service, or of the different curvature and width. Each of these two classes of pumps can be increased by changing the impeller from 12 million to 15 million for the Côte-des-Neiges service and from 15 to 18 million for the Outremont service.

This station is operated by means of two 3-phase cables installed between it and the Atwater Street station of the power company and connected to the high-tension loop referred to above, one cable being sufficient for the load, the other being kept as a reserve.

Besides these two cables, another source of supply through another cable is delivering energy at the McTavish from Vallée Street substation of the power company. With these three sources of power supply, the service of this station is expected to be as good as that of the low level pumping station. The electrical equipment is laid out in duplicate for oil circuit breakers, bus-bars, and affords a possibility of quick repair. The motors operating the six pumps are six 1,000 h.p. synchronous type, and capable of power factor correction up to 80 per cent leading power factor. The starting of these motors is done automatically and in case of interruption, we expect that this station operating two different services will be put back in service in the minimum time and without line disturbances.

#### HIGH PRESSURE ZONE

The high pressure zone is served by electrically driven pumping stations, one located at the Côte-des-Neiges reservoir which repumps the water of this reservoir into the system, having a small reservoir on top of the Westmount mountain to take care of the difference in the water between the consumption and the pumpage.

Another electrically driven pumping station located on Cedar Avenue pumps the water into its system, having a small reservoir on the

Montreal mountain to take care of the difference between the consumption and the pumpage.

The Montreal Water Board is now making plans and specifications for a similar pumping station and reservoir system to be installed in connection with the Outremont reservoir and to feed the upper part of the second Montreal mountain back of the University of Montreal. These stations will be made automatic owing to their smaller size.

This is in general a description of the Montreal Water Supply system. In reference to the distribution mains, until now they consisted mostly of cast iron and steel pipes, but recently reinforced concrete pipes have been used for higher pressures in order to avoid the bursting of cast iron pipes, and the corrosion affecting steel pipes, and electrolysis in both cases.

The Montreal Water Board is now installing a 34" reinforced concrete main between the McTavish reservoir and the Côte-des-Neiges reservoir.

In reference to water hammer, this question, after being carefully studied, has been solved by the use of Johnson valves. These, sometimes called "needle valves," consist of a plunger acting in a cylindrical chamber, and by moving this plunger back and forth, the valve is either closed or open. The operation of these valves is hydraulic and also electrical. The control device is arranged in such a manner that under an interruption of power the valve closes three-quarters of its stroke in a few seconds and the remaining quarter in a time adjusted to be between 5 to 10 seconds, thus eliminating the water hammer. In other words, these valves act as slow closing check valves. We have in the low level pumping station 18 of these and in the McTavish Pumping Station 8. Similar valves will be installed in various parts of the city, so as to close automatically sections of the distribution system in case of a break or trouble.

#### CHLORINATION OF WATER

Our chemist and filtration plant superintendent have been working for many years on a chlorinating device of very different nature from the ones generally in use. This chlorinator is based on the faculty of a photo-electric cell to change its resistance in proportion to the light it receives.

# EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

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## BOVINE TUBERCULOSIS AND HUMAN HEALTH

A REPORT of more than usual interest has recently appeared.<sup>1</sup> At the London Congress on Tuberculosis in 1901, Robert Koch lent his great authority to the belief that bovine tuberculosis did not constitute a menace to human health. While there were those at the Congress who combated his position, it was not until 1902<sup>2</sup> that positive proof, such as had been demanded by Koch, was given that the bovine organism could produce tuberculosis in human beings. Two National Commissions, one English and the other German, have since confirmed the fact that bovine tuberculosis is transmissible to human beings, and it is safe to say that there is no one in the world today who ranks as an authority who does not admit the fact, though there is still some question over the actual amount of human tuberculosis due to infection from bovine sources. Thirty years have passed since the positive proof was given. In the meantime, many private workers have given added testimony and it seems curious that there are still so many people who ignore or belittle the danger of cattle to human beings as a source of tuberculosis.

The report in question states that while the incidence of bovine tuberculosis varies, in some places it is responsible for between 10 and 15 per cent of the cases of tuberculous bones and joints, and urges that this source of infection be more carefully guarded against. It states further that of children under 5 years of age suffering from tuberculo-

sis, 21 per cent of the cases are due to the bovine type of organism, while between the ages of 5 and 16 the percentage rises to 26.

It seems needless to add that pasteurization is at present our greatest safeguard, though the difficulties of having this process carried out properly in rural sections and in small towns are evident. Federal, state, and city governments have played a large and commendable part in bringing about as good conditions as now exist, but it is evident that much remains to be done.

An interesting observation quoted from Dr. Maxwell Harbin, of Western Reserve University, is that there has been a steady decrease in tuberculous disease of bones and joints in children, but an increase in adults. He attributes this as being probably due to the protection given by public health measures during childhood, and expresses the fear that due to the depression through which the country is now passing, public health activities may be let down and the situation be changed. His opinion is apparently shared by a number of other investigators in various parts of the country.

Certainly we have here a strong incentive for urging health authorities not to relax in any degree their efforts, and for appropriating bodies to maintain to the fullest possible extent their financial support.

#### REFERENCES

1. Report of Committee on Prevention and Research of International Society for Crippled Children, Rochester, N. Y., Apr. 18, 1932.
2. Ravenel, Mazzyck P. Pathological Society of Philadelphia, May, 1902.

### MENTAL HEALTH IN HARD TIMES

IN times like the present there is much talk about widespread mental and nervous disturbances, due to the stresses and strains induced by economic distress. It is natural to assume that conditions such as those created by the current depression, which is so severely taxing the adaptive capacities of a large section of the population, would tend to unbalance many of the more poorly adjusted and result in a higher frequency of mental and nervous disorders.

It is true that the depression is adversely affecting the mental and emotional lives of a great many of us and is causing all sorts of maladjustments in individual, family, and social life, especially among those whom the depression has hit the hardest—the unemployed. There is ample evidence to this effect. There is no evidence that it is greatly increasing admissions to mental hospitals, and there is little ground for alarming statements, such as have recently appeared in the press, that point to a tremendous rise in insanity, crime and suicide “all the outcome of nervous disorders induced by present-day condi-

tions." There is little in the way of first-hand information, based on impartial, objective study, to warrant such a generalization.

A preliminary inquiry by The National Committee for Mental Hygiene reveals no country-wide rise in mental disease of institutional severity, although here and there mental hospitals do report increases in admissions and readmissions. It is not likely that conditions would reflect themselves so soon in this way. Mental diseases do not occur suddenly, but develop gradually over varying periods of time, and the factors that enter into the production of mental diseases are too numerous to look for a mass increase in mental diseases from any one cause, or even one set of circumstances, like those of the present economic emergency.

As a matter of fact, we are not so sure that mental diseases have increased to any great extent, if at all, in recent years. There is a strong presumption that they have, but there is no conclusive evidence, one way or the other. The number of mental patients under care, it is true, has increased and multiplied, but authoritative opinion on the whole has referred this to the widespread increase in the provision of treatment facilities coincident with the advent of mental hygiene, not to an equivalent increase in mental disorders. More mental illness has been uncovered, thanks to the educational effects of the mental hygiene movement. The inimical effects upon mental health of the high-powered living conditions of the modern era have been assumed but not proved.

There is no recorded jump in hospital admissions consequent upon the World War, another capital crisis that might have been expected to land great numbers of us in mental institutions. Nor are there indications as yet that lead us to expect any wholesale increase in admissions to mental hospitals in the immediate or remote future as a result of the depression. Even if there should be a marked increase, it will be difficult to isolate the economic factor as a major determining cause. The problem of mental disease is too complex; there are too many unknown factors. It is said that there have been many more suicides since the depression. In this respect the findings in mental hospitals are negative.

While we may not be heading for an epidemic of mental disorders of such proportions as to swamp our hospitals with mental cases, it is evident, nevertheless, that the depression is creating serious mental problems. There is, for example, a decided increase in admissions and readmissions to institutions for the feeble-minded, indicating a marked tendency to eliminate the lower grades of the mentally defective from industrial and social life. As there are institutional facili-



ties for only a fraction of the number of mental defectives in the community, enforced idleness in this group may well be complicating the problem of crime, delinquency, and dependency.

Nearly all state institutions report a reduction in their discharges and paroles, another result of unemployment conditions, which is making it difficult to return patients to the community. It is here that the depression will have one of its worst effects. Added to the chronic overcrowding of mental hospitals and the lack of adequate facilities and personnel for individualized attention, this swelling of institutional populations will make it all the more difficult to maintain standards of care and treatment above the custodial level. There is little money available for institutional expansion. Many curable cases will become incurable, due to the curtailment of treatment facilities.

Preventive work is being retarded, by the restriction of clinical and other mental hygiene activities. There is a temptation to provide only for the immediate necessities, and to cut down on provisions for active treatment and forward-looking preventive measures. The depression is accentuating problems in human adjustment which make mental hygiene work all the more necessary, yet budgets are being drastically reduced.

These problems are reacting on the younger generation in many ways. Marked changes in family life have been noted. Among the destructive effects of economic distress are, for example, those observed in children who develop extreme anxiety because of lowered morale in the home and the fear as to what may happen to that home. This, in turn, engenders hostility toward society, which is blamed for allowing such a situation to occur. The depression is undoubtedly undermining individual and family security; and a sense of security, psychological and economic, is essential to the maintenance of good mental health. The experience of our mental hygiene clinics may have something to show in this connection in the next year or two.

Child guidance workers report that offenses against property have increased during the past two years, and that conditions are favorable to a rise in the number of youthful offenders. Adolescents who in normal times would be working out their problems in healthful emancipation are now balked in making the normal adjustments, because of their difficulty in finding work, and psychologically speaking, their place in life. They are developing habits of idleness and other personality traits that augur ill for later life.

Thus we see many by-products of the depression that are aggravating the mental health problem in various ways. The mental hospital is not the only barometer of the effects of the depression on mental

health. We expect to see not so much a large increase in hospital cases of mental disease as in the incidence of the milder mental and nervous conditions, of personality disorders and maladjustments of various kinds and degrees, not only among the underprivileged but in all classes of the population.

### THE SIXTY-FIRST ANNUAL MEETING

THE Sixty-first Annual Meeting of the American Public Health Association will be held in Washington, D. C., October 24-27, 1932. The headquarters will be the Hotel Willard.

The scientific excellence of Annual Meeting programs is too well known to need further comment. The annual gathering of public health workers which the American Public Health Association sponsors has achieved such a reputation that allied organizations in increasing numbers are planning meetings at the same time and place. This year we shall welcome to our sessions members of the following organizations: American Association of School Physicians, American Social Hygiene Association, International Society of Medical Health Officers, Conference of State Sanitary Engineers, Conference of State Laboratory Directors, Association of Women in Public Health, Oyster Growers and Dealers of North America, and National Shell Fisheries Association.

The American Association of School Physicians as a body will join with our Child Hygiene and Public Health Nursing Sections for one or more discussions. In order to avoid conflict with the many fine things they know by experience will be scheduled by the American Public Health Association, the School Physicians will hold their individual meetings on the Friday, Saturday, and Sunday before October 24. The Conference of State Sanitary Engineers will meet as usual on Friday, Saturday, and Monday and then merge their meeting with the Public Health Engineering Section.

The Public Health Education Section is undertaking for the first time a Health Education Institute, arranged for Saturday and Sunday, October 22 and 23. The students, limited to 25, will be drawn from the growing body of health education workers in official and nonofficial agencies. The instructors will be individuals who have had practical experience extending over many years in the creation and development of programs of health education in health departments and other health organizations. It is safe to say that such a faculty could not be assembled in any university in the United States. A short, intensive course in the philosophy and principles of health education will be

given, and students will be told how to build a program, how to set it up, and how to carry it through, with adequate instruction in the implements available for the projection of health information including the use of the spoken word, the printed word, the picture, the poster, and the motion picture.

The Industrial Hygiene Section will present an exhibit of major preoccupations of the Section. The results of experimental and research work will be shown, new methods found successful in the treatment and diagnosis of occupational diseases, and in general, progress and problems in preventive medicine in industry will be illustrated. Original work is demanded by the Scientific Exhibits Committee, and each exhibit will be in the name of the individual responsible for it.

This exhibit will be placed in one section of the Willard Room near the exhibits of services, products, and equipment, believed to be of value in health protection and promotion, which are provided by our commercial exhibitors every year. The Palm Room will also house commercial exhibits. A number of new products have been developed and marketed during the past year, which have not been called to the attention of members of the American Public Health Association up to this time. The health exhibit is always a feature of the Annual Meeting and of real service to the delegates.

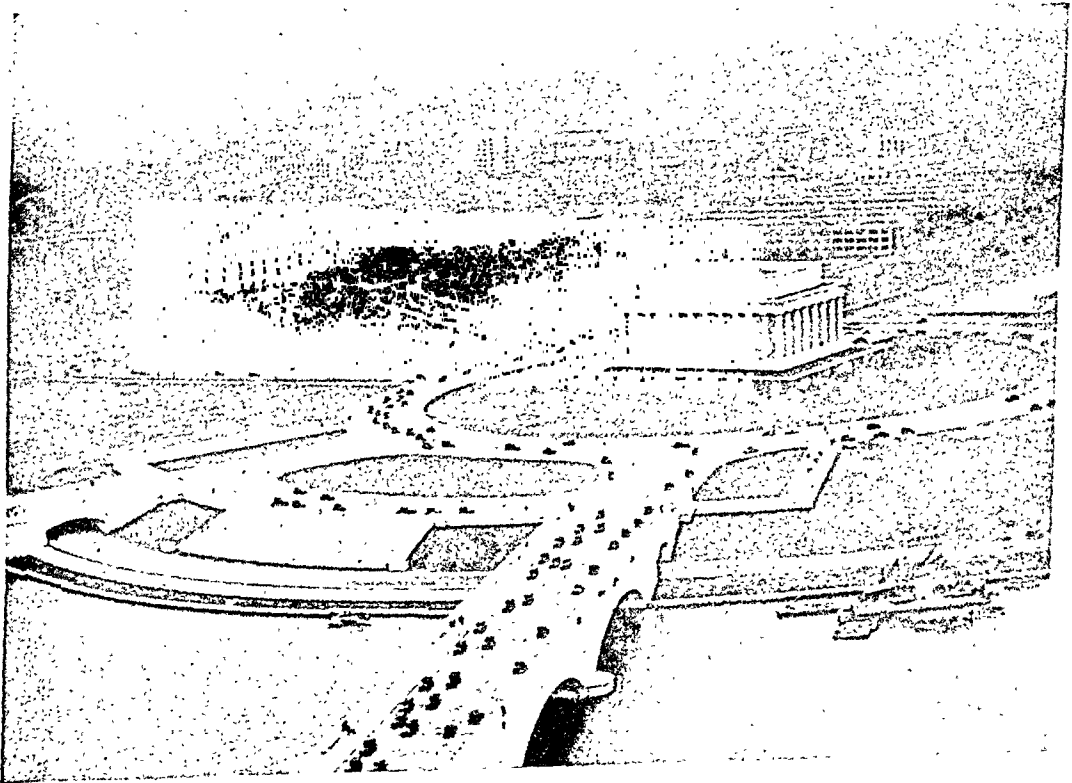
Everyone knows that the ten sections of the Association hold individual meetings, and two or more combine frequently for joint meetings. Special sessions on timely subjects calculated to interest the majority of members are always arranged. The opening general session will take place on Monday evening with Dr. Dublin's Presidential address the main feature. The annual banquet will be held on Wednesday evening. A special session on mental hygiene and a presentation of the work of the ten Sections will be scheduled for two afternoons. A third session is being held open by the Program Committee to permit a discussion of topics which may be pertinent later in the year and which cannot be anticipated at this time.

The Section programs, still incomplete, show many interesting things. The Committee on Training and Personnel will sponsor a luncheon meeting at which the training of engineers, nurses, and health officers will be discussed. Diphtheria will be the topic at another luncheon meeting. Several sections are developing symposiums. There will be one on air hygiene; one on incidence, identification, and significance of bacterial carriers; one on Standard Methods; one on bacterial dissociation; one on vital statistics registration problems; and one on participation of the medical profession in health education.

The Washington Local Committee, under the able direction of Dr.

William C. Fowler, Chairman, is arranging a program of inspection trips in and around Washington, and of entertainment in which every delegate will be interested. A minimum amount of recreation is essential during a scientific meeting extending through four days, and the value of social contacts made at such times should not be overlooked.

Members of the Association will travel to and from Washington at the convention rate of three-quarters of the round trip fare granted by the railroads. Lower-than-usual rates for hotel accommodations have been secured for members by the Association. Attendance at the Sixty-first Annual Meeting need not be expensive. Perhaps more than at any time in recent years is an expenditure for travel to the Annual Meeting justified. Health workers who are fighting reduced appropriations in the face of increasing responsibilities will have their courage restored through the awareness of their numbers, their strength, and their influence that gathering together in Washington will impart.



*Arlington Bridge and Lincoln Memorial  
Washington, D. C.*

# ASSOCIATION NEWS

*Sixty-first Annual Meeting of the A. P. H. A.  
Washington, D. C., October 24-27, 1932  
Headquarters, Willard Hotel*

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A. P. H. A. by the Sub-committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

### *Health Officers Section*

Pedro Rivera Aponte, M.D., Public Health Unit, Cayay, P. R., Health Officer  
Dr. Manuel B. Berrios, M.D., P. O. Box 92, Yabucoa, P. R., Health Officer, Public Health Unit  
Francisco J. Casaldue, P. O. Box 935, Mayaguez, P. R., Director, Public Health Unit  
George E. Clarke, M.D., Oakland, Md., Deputy State Health Officer  
John R. Downes, M.D., Newark, Del., Deputy State Health Officer  
Dr. Percival E. Faed, Gainesboro, Tenn., Officer in charge Trachoma Control Activities  
Mario McC. Fischer, M.D., Health Dept., Duluth, Minn., Director of Public Health  
Carl M. Gambill, M.D., Salyersville, Ky., Health Officer, Magoffin County  
Andres Montalvo Guenard, M.D., Public Health Unit, Bayamon, P. R., Health Officer  
Guy G. Lunsford, M.D., Millen, Ga., Commissioner of Health, Jenkins County  
George F. Reeves, M.D., Nashoba Assoc. Boards of Health, Ayer, Mass., Health Officer  
Juan del Rio, M.D., Loiza, P. R., Chief, Public Health Unit  
Julio A. Santos, M.D., Box 746, Arecibo, P. R., Director, Public Health Unit  
Rafael Ramirez Santos, M.D., Salinas, P. R., Health Officer  
Raymond L. Smith, 518 S. Dickel St., Anaheim, Cal., Food and Sanitary Inspector  
Rafael S. Vazquez, M.D., Manati, P. R., Chief, Public Health Unit  
Charles G. Wharton, M.D., 116 Temple St., Los Angeles, Calif., Asst. City Health Officer

Cas. P. Wilson, M.D., Sevierville, Tenn., Box 54, Health Officer

### *Laboratory Section*

Vivian R. Lederer, Pomona Health Center, Pomona, Calif., Bacteriologist  
Rocco Leone, Waltham Inn, Waltham, Mass., Laboratory Technician  
Paul S. Nice, 312 17 St., Denver, Colo., Consulting Bacteriologist  
Nelly K. Whitfield, Box 18, Dotham, Ala., Director, Dotham Branch of State Laboratory

### *Public Health Engineering Section*

General T. Prater, Cleveland, Tenn., Sanitary Officer

### *Industrial Hygiene Section*

Thomas M. Carey, 622 Jefferson Ave., Defiance, O., Ventilation Engineer  
Daniel H. Goodnow, Jr., 6 Jackson Road, W. Medford, Mass., Student (Assoc.)

### *Food and Nutrition Section*

Donald H. Cook, Ph.D., School of Tropical Medicine, San Juan, P. R., Associate Professor of Chemistry and Nutrition  
Luis G. Hernandez, School of Tropical Medicine, San Juan, P. R., Instructor in Chemistry  
J. Edward Kimlel, 502 U. S. Custom House, Denver, Colo., Charge Food and Drug Admr., Lab.  
John S. Koen, Rm. 64, Municipal Courts Bldg., St. Louis, Mo., Chief Meat Inspector  
G. Edward Pendray, 450 W. 22 St., New York, N. Y., Editorial Dir., Milk Research Council (Assoc.)

Rafael del Valle Sarraga, P. O. Box 935, San Juan, P. R., Director, Chemical Laboratory

*Public Health Education Section*

Arthur H. Bryan, V.M.D., 4400 Raspe Ave., Baltimore, Md., Assistant Professor of Bacteriology, University of Maryland

Clough T. Burnett, M.D., 550 Metropolitan Bldg., Denver, Colo., Associate Professor of Medicine, University of Colorado

Caldwell Martin, 704 Symes Bldg., Denver, Colo., Member Executive Comm., Denver Community Chest (Assoc.)

Cornelia Mooter, 4809 Baring Ave., E. Chicago, Ind., Teacher, Physical Education, McKinley School

William H. Perkins, M.D., 1430 Tulane Ave., New Orleans, La., Professor and Director Dept. of Preventive Medicine

Ruth E. Whitney, Dept. of Public Health, Yale School of Medicine, New Haven, Conn., Assistant

*Public Health Nursing Section*

Douschka M. Alford, Elizabethton, Tenn., County Public Health Nurse

Marion G. Crowe, 303 Fitzpatrick Bldg., Portland, Ore., Supt., Visiting Nurse Assn.

Mary C. Ferguson, R.N., Liverpool, N. S., Victorian Order Nurse

Margaret Leddy, R.N., 3312 Federal St., Camden, N. J., Local Supervisor, Metropolitan Life Insurance Co.

Helen J. Marble, 204 High St., Pawtucket, R. I., Director of Nurses, Central Falls Chapter, A. R. C.

Cecilia M. Mink, R.N., 541 Washington St., Allentown, Pa. (Assoc.)

Essie M. Sanborn, County Health Dept., Trenton, Tenn., Public Health Nurse

Margaret Stiles, R.N., Box 54, Sevierville, Tenn., Public Health Nurse

*Unaffiliated*

Lester L. Griffith, Box 54, Sevierville, Tenn., Sanitary Inspector

George B. Holmes, Dresden, Tenn., Sanitary Inspector, Weakley County Health Dept.

DECEASED MEMBERS

George Eastman, Rochester, N. Y., Elected Honorary Fellow 1915

Carl C. Gibbs, Lake Forest, Ill., Elected Member 1928

Herman O. Hodson, Hillsboro, O., Elected Member 1930

E. Franc Morrill, M.D., Rock Island, Ill., Elected Member 1930

D. Palmer Smagg, M.D., Stottville, N. Y., Elected Member 1926

# PUBLIC HEALTH ADMINISTRATION

## ANNUAL REPORTS

JOHN P. KOEHLER, M. D., F. A. P. H. A.

*Health Commissioner, Milwaukee, Wis.*

ONE of the most annoying problems that every health officer has to face annually is the compiling of an annual report. It is an accepted fact that every well managed organization makes an annual report to its members or stock holders. A health department can be no exception, if it wishes to maintain the confidence and coöperation of its supporters.

The compiling of annual health department reports is becoming more and more of an onerous duty for the health officer, instead of a much desired opportunity. This is due to several reasons. While a great deal of emphasis is laid upon annual reports by health authorities, the importance of such reports is not always appreciated by those responsible for the health department's budget. The question, therefore, arises, how can a health officer issue a report which is a credit to his department without having any or adequate funds set up for such a purpose?

Not only does a health officer have to worry about the cost of his annual report, but also about its contents. If he makes a long detailed report, he is told that no one will take the time to look it over, and if he condenses his report too much, he is in danger of omitting information desired by other health departments and also necessary in his own office for future reference. Since 1921, the Milwaukee Health Department was not given any funds for the printing of an annual report. A condensed report of the Health Department activities has

been included in the annual report of all city activities by the Municipal Reference Library. This has been the only report available to the general public. For its own files and for the Mayor, the Common Council, and the Municipal Reference Library, the Health Department prepared four complete typewritten reports. This arrangement has not proved entirely satisfactory because the condensed report of the Library did not contain sufficient information for people especially interested in health work, and the typewritten reports were not available for public distribution.

It is for this reason that it was possible to persuade the Municipal Reference Library to give the Health Department more space in its annual report for 1931. Since it was considered extravagant to mail complete reports of all city activities to people who were only interested in the Health Department's work, it was decided to have reprints made of the Health Department's report. The Library paid for the reprints of a 40-page report at a cost of 5 cents each. The Health Department paid for 3 extra pages and a cover for the reprint at 7 cents each. This arrangement made it possible for the Health Department to have 400 copies of a printed report for general distribution at a cost of \$28.00, which could easily be spared from its general publication fund.

It has also been found advisable to make some changes on the typewritten report kept in the department for a

permanent record. In the past, we have depended a great deal upon our letter files for the keeping of valuable information. We have learned from experience, however, that it is very difficult to get information out of a letter file concerning events that occurred many years ago. It is for this reason that, beginning with the report of 1931, the typewritten report will not only contain a detailed account of the various activities of each division of the Health Department, but also an appendix containing all information which might be of value in future years.

Such an appendix might contain not only all ordinances passed, but also ordinances defeated, with the reasons for their defeat. All special surveys and reports which might be too cumbersome to insert in the regular report can be included in such an addition. Many discussions on controversial subjects occurring during the year might be entered in such a report and yet be out of place in a report leaving the Health Department. Copies of very important letters and other documents can be entered in such an appendix. At the present time it is almost impossible to obtain much detailed information on events that occurred 10, 15, or 20 years ago, because reports compiled and printed for the use of the general public can obviously not contain all of the information desired from time to time by the Health Officer and his associates.

Necessity has been the mother of invention in the Milwaukee Health Department. Where it was unable to have one report printed due to lack of funds, it is now preparing three reports; one condensed, printed report for general distribution, three complete typewritten reports for the Mayor, the Common Council, and the Municipal Reference Library; and one detailed typewritten report with supplementary material for the files of the Health Department.

In addition to these three reports, the

Health Department issues a statistical report for other health departments, and prints a summary of its annual report in 9,000 copies of its monthly bulletin.

Decatur, Ill.—With an estimated population for 1931 of 58,600, there were 1,133 births in Decatur, a rate of 19.3; 738 deaths, giving a rate of 12.6.

Especially noteworthy was the fact that there were no maternal deaths, which is an unusual record for a community of any size. Among the more important causes of death were heart disease, cancer, pneumonia, and apoplexy. Tuberculosis has been relegated to 7th place on the list and, with 21 deaths, was only slightly above suicide with 19 deaths. The infant mortality rate was 47.6. The Health Commissioner is to be congratulated upon a very readable type of report, illustrated with simple pictures. The material is presented in such manner as to be very useful in the Interchamber Health Conservation Contest.—*Annual Report*, City of Decatur, Ill., 1931.

Framingham, Mass.—This city had the lowest death rate of its history, 9.9 per 1,000, in 1931, and a new low figure for tuberculosis of 22.5 was established. With a population of 22,222, there was expended for public health work the sum of \$24,686.33 or \$1.11 per capita.—*Annual Report*, City of Framingham, Mass., 1931.

Evanston, Ill.—The net death rate figure, excluding non-residents and after correcting for the deaths of citizens of Evanston in Chicago, was 8.02, a slight decrease over 1931. Among the principal causes of death were: heart disease, cancer, cerebral hemorrhage, pneumonia, and tuberculosis. The infant mortality was 39.2, an advance over the rate of 33.8 for 1930. There were 4 more cases of diphtheria than in the preceding year, and 8 more carriers



were found. However, 9 cases including 1 carrier and 1 death occurred in a single house into which a family from the country had moved but a short time before the outbreak. All told, there were only 19 cases of diphtheria, 7 of which were in the preschool group.—*Annual Report, City of Evanston, Ill., 1931.*

Salem, Mass.—The death rate of 13.1 was slightly higher than that of the preceding year as was the infant mortality rate. There has been a noticeable decrease in diphtheria cases and deaths. With a population of 43,353, there were reported only 14 cases of pulmonary tuberculosis and 9 cases of other forms of tuberculosis. There were 10 cases of infantile paralysis, of which 2 were fatal.—*Annual Report, City of Salem, Mass., 1931.*

Child Hygiene in Pennsylvania—With the coöperation of the Department of Public Instruction, all new school building projects were referred to the School Division of the State Department of Health for investigation of the water supply and the proposed method of sewage disposal. A total of 555 investigations were made and finally approved as a result. Improvement of sanitary conditions in school buildings throughout the state was secured by personal conferences with the school boards and county superintendents of schools. Among other results, there were 228 school buildings equipped with flush toilets.

Two motor units spent 3 summer months as usual in rural districts. Each car operated with a staff of 2 doctors, 2 dental hygienists, and 2 or more nurses. The cars the past year for the first time were driven by medical students. A special feature of the summer was the attention given to vision testing of children of 4 years of age and over. The 2 medical students were instructed in

vision testing by the Director of Sight Conservation of the State Council for the Blind, and under her guidance each student was given experience preparatory to the motor unit work. There were 378 cases found of children having eye defects, and extra follow-up care was necessary in order to insure against further sight damage. In the areas visited, local committees were formed if there were not already Parent-Teacher Associations or other organizations to coöperate in the child hygiene work carried on by the motor units. All cases found with defects were referred to the family physicians, and home visits were made by nurses or lay committee members to aid in stimulating parents to secure necessary professional attention.—*Yearbook, Pennsylvania Dept. of Health, 1930.*

Cattaraugus County (N. Y.) Developments—The 9th year of the county health unit plan of Cattaraugus County is marked by the taking over of the routine services by public authorities, the beginning of a series of investigative projects, supported by the Milbank Memorial Fund, and progress in integration of health and welfare authorities, particularly enhanced by the gift of the Bartlett Community Center in Olean, in which are now located the offices of most of the health and welfare agencies of the county.

The budget for 1931 totalled \$87,000, half of which came from the county, and a like amount from state funds. The department has taken over responsibility for health in the Allegany Indian Reservation, hitherto covered by one nurse under the District State Health Officer. In addition, the county health officer serves as health officer to Allegany State Park, this arrangement having been approved by the State Park Commission and the Cattaraugus County Board of Health.

The birth rate seems practically

stationary, being 20.2 for 1931, as contrasted with 20.4, the average for the 10 years. The infant mortality rate for 1931 was 64, with a 10-year average of 72. The diphtheria situation has merited special attention. Fourteen of the 26 cases occurred in one town where 64 per cent of the preschool children are immunized. This suggests increased virulence of the diphtheria organism, and is considered a warning to other communities that diphtheria is still a dangerous disease. The tuberculosis death rate for the county for the past 10 years shows a remarkable decrease, from 68.3 in 1923 to 41.4 in 1930, and a new low level of 30.8 in 1931, 28 per cent less than the 5-year average. Evidence in the county points toward a low rate of infection under 20 years of age, and the bureau looks forward to establishing tuberculin testing and X-raying in the larger schools as its next step forward.

The nursing program aims to give the best possible service for the amount of money appropriated. Although the staff is large in comparison with that in many rural areas, it is about half the size actually desirable. The withdrawal of the state nurse from the Indian Reservation has added considerably to the existing case load of each nurse. This year for the first time a student program has been attempted.

Classes in home nursing, child care, and first aid, taught by nurses in 1931, reached 236 persons. In rural communities this aspect of the work is important. School work is shown to have occupied 11 per cent of the nurses' time and is on the increase. It is felt to be time well spent, and Cattaraugus County schools far exceed *Appraisal Form* standards in correction of defects. In the fall of 1931, a new school program was inaugurated with the following objectives: (1) Higher percentage of correction of defects; (2) more parents present at school physical examina-

tions; (3) better building inspection; (4) a more uniform health education program; and (5) improved record systems for teacher and nurse. All of these aims have been partially realized.

Since specialized supervision has been discontinued, staff education is being carried on by means of the available services of the State Department in the form of group conferences, institutes, and extension conferences.

The year 1931 represents the 3d year of operation of a sanitation bureau under the full-time supervision of a sanitary engineer. The report reviews the variety of service given and shows a demand for supervision of private water supplies, drainage problems, building sanitation, public water supplies, milk control, sewage disposal, and the like. A demand for sanitary sewage disposal systems for rural schools is noted.—*Cattaraugus County Dept. of Health Report, 1931.*

**Orange County, Calif.**—A full-time health unit was initiated in Orange County in 1923. Its jurisdiction was at first limited to the unincorporated area, but gradually service has been extended to towns and cities. A population of approximately 120,000 is now served. Newport Beach is the only city having its own health department.

School health work, with the exception of communicable disease control, is in some districts under the direction of the Board of Education. In others, it is under the direct supervision of the Health Department, but reimbursement is made by the Board of Education on the basis of service rendered. In the examination of 12,485 children, a total of 6,444 physical defects were found, and of these, 1,684 were corrected during the year.

Thirty-three child welfare clinics were held every month in various parts of the county. A registration of 7,046 infants and preschool children represents

an increase of 2,474 over 1930. No prenatal clinics are held. Expectant mothers coming to the attention of the health department are referred to the County hospital for this service.—*Annual Report*, Orange County Health Dept., Calif., 1931.

**Tuberculosis Mortality Among Young Women**—A very careful sociological study of the 180 deaths from tuberculosis among young girls from 15 to 25 years of age which occurred in Detroit in 1930 has been made. That the tuberculosis death rate among adolescent girls has been declining at a less rapid rate than has occurred for other age and sex groups is well known to all students of the subject.

The author concludes that up to the age of 18, no marked disparity was evident between the male and female tuberculosis rates. She recognizes that the problem of tuberculosis among the negro population is serious and appears to be accentuated among young females. The author further concludes that the income of the family had no particular influence upon the tuberculosis mortality, nor did the housing conditions under which these individuals lived.

Deaths were not concentrated among uneducated girls but occurred in a group which slightly exceeded the normal educational level. Employment of girls exerts little if any influence. There is no indication that the wearing of insufficient clothing was a contributory factor. The emotional tension and the ambition for popularity reflected in the forms of recreation enjoyed, together with insufficient rest, probably combined to predispose to tuberculosis in a considerable number of cases.

There was evidence of a distinct tendency toward marriage and child-bearing at an early age. Pregnancy during the age period before 20 was common and closely linked up with the onset of disease. Undoubtedly this

constituted the most important single causative factor in the mortality of this group.—Edna E. Nicholson, *A Study of Tuberculosis Mortality Among Young Women*, Social Research Series No. 1, National Tuberculosis Assn.

**New York State**—"Public health should be the State's paramount interest and the success or failure of any government must be measured by the well-being of its citizens," declared Governor Franklin D. Roosevelt, in commenting upon the final report of the Governor's Special Health Commission, entitled "Public Health in New York State," recently made public. After nearly 2 years of study, the commission, of which President Livingston Farrand of Cornell University is chairman, and State Health Commissioner Thomas Parran, Jr., is secretary, has submitted the final report.

Hailed by authorities as the most adequate survey ever made of the public health resources of the state and the most comprehensive state program for individual and community health action ever formulated, the report should attract wide interest among public authorities and community leaders throughout the United States. The new health program recommended by the commission sets up guideposts for long-range planning and action in public health for the next decade or two. Special attention is called to the unnecessary cost of preventable sickness and the savings in community expenditures for community relief which are possible by the application of modern methods of disease prevention. The report recommends that the present system of local health service be reorganized by substituting the county for the town and village as the local unit, with the appointment of a county board of health and health commissioner in all counties.

"Only half of the chapter on tu-

berculosis has been written," said the Governor. "During the past 25 years tuberculosis has been dislodged from 1st to 6th place as a cause of death, and its rate cut in half. Its rate may again be cut in half and the reduction in present expenditures for caring for the victims of this disease will pay the cost of the new health program." It is recommended that the three state tuberculosis sanatoriums which have been authorized be constructed and put in operation with the least possible delay. A more comprehensive tuberculosis control program is outlined.

The commission points out that of the 5,606 infants under 1 year of age who died in New York State in 1930, more than one-half would still be living if every community utilized the simple, well known measures which over and over again have proved effective in saving the lives of babies. Other than the indifference of local governments, there is no reason why twice as many babies should die each year in some counties and cities as in other communities where a modern health program is in force, or for tuberculosis to be twice as prevalent in some counties of New York State as in others. Deaths and illness from diphtheria continue to occur, whereas some municipalities have been able to stamp it out entirely. Among the important recommendations dealing with maternal and infant hygiene, it is suggested that the State Department of Health appoint a Maternity Commission to advise in respect to its maternity program, to revise and apply present standards of maternity care, to appraise the findings of case investigations, and to point out the methods of preventing maternal deaths.

The need for prompt and competent treatment of venereal diseases is stressed. The commission presents evidence that these diseases are among the most serious of our public health prob-

lems and that their control is possible by methods similar to those which have proved effective against other communicable diseases. The commission believes that the next great public health achievement can be the suppression of syphilis.

There is urged encouragement of epidemiological measures for the control of venereal diseases on a state-wide basis in coöperation with the medical profession.

Under public health nursing, it is recommended that as county health departments are developed throughout the state, each with an adequate staff of public health nurses, a qualified supervising nurse be placed in each unit under the direction of the county health commissioner, who shall: (a) be responsible for the work of staff nurses; (b) serve in an advisory capacity to and coördinate the work of all public health nurses in the county.

The commission report calls attention to the importance of public health education and recommends that the educational functions of the State Department of Health be reorganized for greater efficiency in interpreting the activities of the department and for greater service to the people; that necessary appropriations be secured for additional trained personnel and requisite facilities. It is suggested that the department assume responsibility for leadership in developing and establishing adequate courses in qualified schools and colleges of the state to familiarize students of medicine, dentistry, nursing, and teaching with the basic principles of public health. There is also recommended an inter-departmental committee to function in all matters having to do with health education in which more than one department of state government is concerned.—*Public Health in New York State*, Dept. of Health, Albany, 1932.

# LABORATORY

## DIPHTHERIA TOXOID PRECIPITATED WITH ALUM

### Its Preparation and Advantages

DEWEY M. WELLS, ARTHUR H. GRAHAM, M. D.,  
AND LEON C. HAVENS, M. D., F. A. P. H. A.

*Alabama State Board of Health, Montgomery, Ala.*

GLENNY and Barr<sup>1</sup> have recently described the complete precipitation of diphtheria toxoid with alum. This procedure differs from previous alum treatment<sup>2,3</sup> in that the toxoid is completely precipitated by the use of larger amounts of alum (2-10 per cent), the precipitate is separated from the supernatant by filtration and is then re-suspended in physiologic salt solution. They showed that the loss of specific antigen in the precipitate was less than 20 per cent while the decrease in non-specific nitrogen, as shown by tests of the supernatant broth, was as high as 70 per cent. Evidence has already accumulated that the antigenic value of toxoid is improved by the addition of alum. Glenny<sup>2</sup> has used it in the immunization of horses and Park and Schroder<sup>4</sup> have used a toxoid containing only 0.2 per cent alum and obtained results in guinea pigs and children which were superior to those with ordinary toxoid.

#### PREPARATION OF THE PRECIPITATED TOXOID

The toxoid precipitate used in the experimental work was prepared as follows: to 1 liter of lot 59, which contained 20 antigenic units per c.c., as determined by flocculation with antitoxin, was added 500 c.c. of a sterilized 4 per cent solution of aluminum-potassium sulphate. A coarse, flocculent precipitate formed at once which settled out in about 4 hours. The supernatant fluid

was siphoned off aseptically and the precipitate was made up to 1 liter with 0.85 per cent NaCl solution. After storage at 4° C. overnight the supernatant liquid was again siphoned off, and 0.85 per cent NaCl added to make the original volume of 1 liter. Biuret tests on the first supernatant indicated that about 70 per cent of the protein of the original toxoid remained unprecipitated.

Contrary to the observations of Glenny and Barr<sup>1</sup> we have encountered considerable difficulty in determining flocculation values with the alum precipitates dissolved in Rochelle salt (sodium potassium tartrate). Furthermore, as they have stated, different lots of broth require somewhat different treatment. We have, however, obtained results with 3 lots of toxoid which seem to be specific and which indicate that 75-80 per cent of the specific antigen is contained in the precipitate and that 50-70 per cent of the protein content of the whole toxoid is left in the filtrate.

In Table I are summarized the results of immunity tests in guinea pigs following a single injection of varying amounts of the alum toxoid. It is seen that not only did as small an amount as 0.1 c.c. cause the production in 4 weeks time of sufficient antitoxin to resist an injection of 5 m.l.d. of toxin, but that an injection of 0.5 c.c. uniformly protected pigs against large amounts of toxin, even as much as 100 m.l.d. In every instance the injections of toxin

were made 4 weeks after the injection of toxoid.

A single injection of the alum precipitate in guinea pigs produced such a high degree of immunity that our observations were extended to the effect of a single injection in children. If a considerable percentage of children could be made Schick-negative by a single injection, mass immunization could be greatly accelerated. A group of 98 children was selected on the basis of strongly positive Schick tests, and these were given a single subcutaneous injection of 1 c.c. of the washed precipitate. The Schick test, made 8 weeks after the injection, was negative in all but 6. There was a complete absence of severe reactions in this group, a further indication that the product was in a purer state.

There are several technical points in connection with the practical procedures still to be determined. As Glenny and Barr have shown, the optimum concentration of alum necessary to produce complete precipitation with a minimum amount of extraneous protein varies with different kinds of broth, and we have some evidence that it may vary with different lots of toxoid made with the same broth formula. We have thus far obtained fairly uniform results by preliminary titrations to determine the optimum amount of alum. The length of time required for precipitation to take place probably varies with different lots. Since the desired result is to obtain the maximum yield of specific antigen in the precipitate in as pure a state as is practically possible, the time should neither be too much shortened nor too greatly prolonged. We have confirmed Glenny's finding that the average time is about 2-4 hours; if the alum is permitted to act much longer than this the protein content of the precipitate increases without a corresponding increase in the yield of toxoid.

The advantages of the alum treated

TABLE I

IMMUNIZING ACTION OF ALUM TOXOID  
IN GUINEA PIGS

Toxoid Lot No.	Amount Toxoid Injected c.c.	M. L. D. Toxin	No. Pigs Tested	No. Pigs Surviving	No. Died Diphtheria Intoxication	Remarks
54	0.5	10	2	2	0	
54	0.1	5	2	2	0	
59	0.5	5	8	6	0	2 died of pneumonia
59	0.5	10	5	5	0	
59	0.5	20	5	4	0	1 died of pneumonia
59	0.5	50	5	5	0	
59	0.5	75	5	5	0	
59	0.5	100	10	10	0	

toxoid are obvious. The complete precipitation of the toxoid with re-suspension in salt solution results in a purified product, as evidenced by the amount of nonspecific protein discarded in the filtrate. The precipitation permits the use of low-grade toxin for the manufacture of toxoid, since the finished product can be concentrated to any desired extent by decreasing the volume of salt solution in which the precipitate is suspended. The chief advantage, however, is the production of immunity in over 90 per cent of children by a single injection. If further observations confirm these results, diphtheria immunization can be greatly accelerated.

#### SUMMARY

Complete precipitation of toxoid with aluminum-potassium sulphate results in a purified product. More than 50 per cent of the original protein remains in

the filtrate. A weak toxoid may by this procedure be concentrated to any desired degree.

The alum precipitate has a high antigenic value. A single injection of 0.5 c.c. in guinea pigs protects against 50–100 m.l.d. of toxin injected 4 weeks later.

A single injection of 1 c.c. in 98

Schick-positive children resulted in a negative test 8 weeks later in 92, 94 per cent.

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## VITAL STATISTICS

### BIRTH AND DEATH CERTIFICATES AS PUBLIC RECORDS

J. V. DEPORTE, PH. D., F. A. P. H. A.

*Director, Division of Vital Statistics, New York State Department of Health, Albany, N. Y.*

AN inquiry addressed to the registration officials of all states (and to the District of Columbia) brought out a striking divergence in the practice of furnishing transcripts of birth and death certificates. A summary of the replies follows:

#### PROCEDURES GOVERNING THE ISSUANCE OF TRANSCRIPTS OF BIRTH AND DEATH CERTIFICATES IN CONTINENTAL UNITED STATES

(Information furnished by State Departments)

#### (1) *Records considered confidential under direct provisions in the law:*

##### (a) *All records*

Alabama—Applicant for certified copy must be "entitled to same."

Kentucky—According to law, "the confidential relation existing between a physician and his patients is extended to the birth certificates." (Quoted from letter.)

Maryland—Certified copies may be furnished any applicant "for proper purposes." The law of the State of Maryland also provides that "any county registrar, local registrar, deputy local registrar, or state registrar, who shall communicate to any person not

authorized to receive the same any of the personal or statistical facts recorded on his register, shall be deemed guilty of misdemeanor and on conviction thereof, shall be fined not exceeding \$300." Annotated Code, 1924, Section 28.

Nebraska—Certified copies may be furnished to any applicant "for any proper purpose."

New Mexico—The law gives power to State Board of Public Welfare to promulgate regulations to prevent "wrongful or improper use of the information contained" in certificates of births, deaths, and marriages.

New York—Certified copies must be supplied to any applicant unless the state commissioner of health "is satisfied that the same does not appear to be necessary or required for judicial or other proper purposes."

Texas—The law provides that certified copies shall be supplied upon request to "any properly qualified applicant." An amendment to the law forbids the issuance of "a certified copy of any birth or death certificate wherein a child or an adult is stated to be illegitimate unless such copy is ordered by a court of competent jurisdiction."

#### (b) *Only records of births or deaths of illegitimate children*

Minnesota  
Virginia  
West Virginia

(c) *Only original records that have been corrected*

Massachusetts—All records are open to public inspection "excepting in cases of original records that have been corrected; the corrected records are open to public inspection, but the original records that have been corrected are open only to inspection by the persons concerned or such officials whose duties would require that they may be inspected." (Quoted from letter.)

(2) *Records considered confidential under regulations of the Department of Health or an opinion of the State Attorney-General; no direct provision of the law:*

(a) *All records*

Florida	No. Carolina	Tennessee
Idaho	Ohio	Wisconsin
Iowa	Oregon	Wyoming
Louisiana	Pennsylvania	

(b) *Only records of illegitimate births*

Arkansas  
North Dakota  
Utah

(c) *Only birth certificates*

District of Columbia

(3) *No legal provision or state regulation. A number of replies stated that the requirement of a fee for a search or transcript acts as a deterrent in many instances where the motive of the applicant is mere curiosity:*

Arizona	Kansas	New Jersey
California *	Maine	Oklahoma
Colorado	Michigan	Rhode Island
Connecticut	Mississippi	So. Carolina
Delaware	Missouri	So. Dakota
Georgia	Montana	Vermont
Illinois	Nevada	Washington
Indiana	N. Hampshire	

\* The regulations of the department of health provide that a search must be "a proper one (in not being merely to gratify idle curiosity or for some scandalous object, or for a purpose in which the inquirer is not beneficially interested)." No reference is made to any restrictions upon the issuance of transcripts when the required fee is paid.

In only 7 states are the records of births and deaths shielded by law against indiscriminate inspection; it is interesting to add that in one of them, Maryland, the communication of any personal or statistical facts contained in the certificates "to any person not authorized to receive the same" is a mis-

demeanor and, on conviction, the registrar is subject to a fine not exceeding \$300. In 11 states the records are considered confidential on the basis of departmental regulations or opinions of attorneys general. In 7 states and the District of Columbia specified types of records, mainly those of illegitimate children, are protected either by law or regulation. In the remaining 23 states, no restrictions are imposed upon the issuance of transcripts other than the payment of legal fees and the convenience and dispatch of public business.

In an opinion, later upheld by the Court of Appeals, the Appellate Division of the New York Supreme Court stated that,

Publicity statutes . . . are common in this country, and they are usually couched in broad terms, but it is generally held that even under such statutes, the individual seeking an inspection must show that the information is sought for some legitimate and specific purpose, and that the gratification of mere curiosity or some speculative purpose will not suffice. What will be deemed a sufficient reason for the examination of any specified records must depend in each case upon its own peculiar circumstances. The department of health . . . differs in many respects from other municipal departments. In consequence of the nature of its duties it becomes the repository of the records concerning the most intimate affairs of the individuals resident within the limits of the municipality, and among these records are doubtless to be found many matters of no public interest, but which might, if disclosed to whomsoever sought to examine them, be used for sinister or unworthy motives. (Matter of Allen, 205 N. Y. 158.)

Certain items on birth and death certificates may be looked upon as being of legitimate public interest: the fact of a birth, the sex of the child, the name of the parents; similarly, the fact of a death, the name, age, and sex of the deceased. Other items, however, do not belong in the same category. The public good, clearly, does not require that an inquisitive person be told the age of her neighbor, or given information re-



garding a birth to an unmarried woman, or furnished with any of the facts contained in the medical part of a death certificate in violation of the accepted practice of all civilized countries which protects the knowledge gained by a physician in the course of his professional duties. In the words of the Court of Appeals of the State of New York:

The disclosure by a physician, whether voluntary or involuntary, of the secrets acquired by him while attending upon a patient in his professional capacity *naturally shocks our sense of decency and propriety* and this is one reason why the law forbids it. The form in which the statements are sought to be introduced is of no consequence, whether as a witness on the stand or through the medium of an affidavit or certificate. *Davis vs. Supreme Lodge, Knights of Honor* (165 N. Y. 159).

For many years, committees of the American Public Health Association, in coöperation with other organizations, have labored over the essential problem of improving the accuracy of certified causes of death. Finally in January, 1932, in another important decision, the same view was emphatically reiterated by the Appellate Division of the New York Supreme Court: \*

The reason assigned for the necessity of such disclosure of official documents of the department of health does not outweigh the importance of keeping the contents of such papers secret.

To divulge to the world the secrets of a patient would not only be shocking, but against public policy.

A uniform classification of causes of death and treatment of joint causes is, of course, essential, but it must be based on the premise that the statement on a death certificate represents the true judgment of the certifying physician. When this judgment is confided to the care of a registration office, is there not

an implied pledge that the physician's statement will be safeguarded and the information used only for statistical record and scientific research?

The accuracy of our natality and mortality statistics is directly related to the accuracy of the information contained in the birth and death certificates and this can be achieved in full measure only through the general acceptance of the principle that facts which relate to "the most intimate affairs of individuals" must be treated confidentially.

**Twenty-Five Years of Public Health in Pennsylvania, 1906-1930**—Vital statistics records for the Commonwealth of Pennsylvania cover the years since 1906 when state-wide registration was begun. These reports indicate that considerable progress has been made in many endeavors of public health workers. Just what has been accomplished can be illustrated best by the birth and death figures for this period.

In 1906, there were 167,265 children born in the state. In 1930, the number was 189,573. Although this indicates an actual gain, the rates show a constant decline. The 1906 birth rate per 1,000 population was 23.4. The peak was reached in 1914 (27.0) and a gradual decrease since that time has brought the rate for 1930 down to 19.6. This diminution is not confined alone to Pennsylvania, for the entire United States Registration Area is experiencing a similar loss. Stillbirths, which are considered separately from both natality and mortality statistics, have diminished correspondingly. Twenty-five years ago there were 8,679 stillbirths with a rate of 51.8 per 1,000 live births, and in 1930 the total was 7,957, giving a rate of 42.0.

It is interesting to note the change in the ranking of the leading causes of death during this interval. Tuberculosis (all forms) held first place in 1906.

\* Health Department's Records Confidential, *Week. Bull. New York City Dept. of Health*, Feb. 6, 1932.

By 1910, it had dropped to 3d and 1925 found it in 6th place, the position it maintained in 1930. Heart disease gained the lead in 1915 where it has remained with a few exceptions. Nephritis, cerebral hemorrhage, pneumonia, diseases of early infancy and cancer, although varying in order, have been among the 7 most important causes of death during the entire 25-year period.

With the exception of 1918 when the severe influenza epidemic resulted in an unusually high toll, the general death rate has declined steadily from 16.0 per 1,000 population in 1906 to a preliminary rate of 11.6 for 1930. By the use of antitoxin, toxin-antitoxin and the more recently developed toxoid, the diphtheria mortality has been lowered from 34.1 per 100,000 population (1906) to 5.2 (1930). Due to the frequency of smallpox vaccination, deaths from smallpox are rare—only 1 since 1925. Because of strict vigilance over quarantine and the widespread education of the people concerning communicable diseases, the losses from measles, scarlet fever, and whooping cough have decreased. Since the sources of milk and water supplies have been carefully supervised and inspected, the disorders which are spread by such carriers have been restricted. Typhoid fever has been reduced from 54.8 per 100,000 population in 1906 to 2.6 in 1930. Diarrhea and enteritis under age 2 has also fallen from 137.2 to 23.3 per 100,000 population.

Infant mortality rates show a great reduction. In the first year of statewide registration, 27,908 children under 1 year of age died, as compared with 12,887 in 1930. The contrast between the rate of 167 per 1,000 live births for the former year and 68 for the latter shows more clearly the true gain.

Great progress has been made in the control of the respiratory diseases, most important of which is pulmonary tuberculosis. From this cause, there were

9,258 deaths with a rate of 129.6 per 100,000 population in 1906, which by 1930 had been reduced to 5,295 with a rate of 54.0. Pneumonia (all forms) and bronchitis have responded also to the attacks made against them. On the other hand, the trend of influenza has been slightly upward. Safety propaganda, together with the development and use of safety devices, has been responsible for the decreasing rate for accidental deaths. This is due in large part to the reduction in mine and quarry disasters. The highest rate recorded for deaths from accidents in this class was 21.2 per 100,000 population in 1907; the lowest, 8.2 in 1930. The rate for fatal railroad injuries has dropped from 30.2 in 1906 to 5.4 in 1930. The death rate from automobile accidents, however, is an increasingly important factor in the general mortality. In 1906, there were 19 persons killed in automobile accidents, with a rate of 0.3 per 100,000 population. Since that time, because of better roads and cheapness in production, motor vehicles have become more numerous and incidentally more dangerous, so much so that in 1930, 2,424 persons in Pennsylvania lost their lives as a result of automobile accidents, bringing the death rate from this cause up to 25.1.

The degenerative diseases have been climbing upward steadily. Heart disease, the leading cause of death, has increased from 133.5 per 100,000 population in 1906 to 239.1 in 1930. During the same period, cerebral hemorrhage has risen from 73.1 to 85.5; cancer from 58.9 to 100.0; nephritis from 84.3 to 104.3; diseases of the circulatory system (exclusive of heart disease) from 16.2 to 30.3; and diabetes from 10.5 to 22.4. Maternal mortality has maintained an even trend over the 25 years under consideration. In 1906, 1,213 women died from causes associated with childbirth. In 1930, there were 1,127. The rates were 6.9 and 5.7 per 1,000

total births, respectively. A large proportion of these deaths were due to puerperal septicemia—39.2 per cent the first year and 37.4 per cent the last.—*Vital Statistics*, Emlyn Jones, M.D., Chief, Bureau of Vital Statistics; *Pennsylvania's Health*, 10: 77-78 (Jan.-Feb.), 1932.

**Post-Vaccinal Encephalitis in Holland**—According to a report by the Inspector-General on Vaccination in Holland, there were 866,100 vaccinations performed in that country from 1924 to May, 1931, and of these, 186 cases were followed by encephalitis, which is equivalent to 1 case of encephalitis to every 4,656 vaccinations.

A special commission appointed to examine each case classified them in 4 groups—namely, (1) undoubted cases; (2) almost undoubted cases; (3) doubtful cases; and (4) very doubtful cases. In the statistics drawn up by the Inspector-General only the first 2 groups were considered. Among about 62,000

children vaccinated in the 1st year of life, there were only 3 cases of encephalitis, and among 137,000 children between the ages of 1 and 2 years only 5 cases, or 1 case among 25,000 vaccinations in children under 2 years of age. All these patients recovered without sequels. Among 660,000 children between 2 and 11 years there were 159 cases, or 1 in 3,570; 55 of these died, a proportion of one death to 15,749 vaccinations. In 1930, 5 cases occurred among 27,131 vaccinations, or one case among 5,426 vaccinations. There has been a great decline in the number of vaccinations after the small outbreak of smallpox in the second half of 1929, and as compulsory vaccination at school age has been temporarily suspended, no case has occurred between May, 1930, and May, 1931, although between 24,800 and 25,000 vaccinations were performed during that period.—*Bull. Office Internat. d'Hyg. Publ.*, Oct., 1931, p. 1804; *Canad. M. A. J.*, 26: 301 (Mar.), 1932.

## PUBLIC HEALTH ENGINEERING

### AN INVESTIGATION OF THE MONTREAL TYPHOID EPIDEMIC OF 1927\*

H. D. PEASE, M. D., F. A. P. H. A.

*New York, N. Y.*

A PRIMARY outbreak of approximately 2,600 cases of typhoid fever reported during March and April was followed by a remission of 3 weeks and a sharp recrudescence of nearly as many cases in the following month of May. A total of 5,353 cases developed

with a mortality of approximately 10 per cent.

Clear indications showed within the first week of reports that the disease was milk-borne and probably attributable to the distributions of the products of two associated milk companies (M and N). Notice was given by the Health Department Director about March 12 to increase the temperature of pasteurization of all milk in Montreal above that re-

\* Abstract of paper read at a Joint Session of the Laboratory and the Food, Drugs and Nutrition Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 16, 1931.

quired, 142° F. for 30 minutes, to 146° or over. A start in the decline of cases occurred about 2 weeks later. Approximately 75 per cent of the reported cases were among consumers of M and N milk. These companies supplied but one-eighth of the total milk supply of the city.

The geographic distribution of cases (pin map) and that of the milk supplies of M and N companies were in close harmony, and the earliest cases with the preponderance of incidence were in children and youths.

There was an entire absence of any such geographic relation between the varied distribution of the three public water supplies and the intensities of incidence of the infection. There was also an absence of bacteriological evidences of water supply pollutions.

A discovery was made in April that a man "C"—the supervisor of the pasteurization equipment in the M and N plants—from January 30, 1927, was a typhoid carrier, and he was discharged April 15. A man "B" who succeeded "C" as operator of the same equipment retired from the M and N plants on April 25 by reason of illness. On May 20 there was obtained a positive Widal test with his blood.

The carrier "C" and this incipient case successor, "B," were in direct charge and operation of the holding tanks, regenerator, cooler and filling mechanisms, each of which possessed certain defects of structure. Also, the records and the evidence as to the methods of cleansing and operation of them by these infected workers indicated the existence of several well defined opportunities for those degrees and times of typhoid infections of the pasteurized milk as might readily account for the peculiarly spaced incidences of the outbreak and its recrudescence.

Reports of procedures followed by employees in the pasteurizing room showed deficiencies in operating meth-

ods of a serious nature, such as standing on the edge of the cooler trough with dripping boots, stirring the pasteurized milk with a dipper picked up from the floor, immersing the hands in the cooled milk to adjust the bulb of a thermometer.

Temperature records were available and led to interpretations of operating conditions as they pertained to the holding tanks, and indirectly to some of the other apparatus. These, together with accurate temperature studies made under ideal operating conditions, presented a picture in which the typhoid carrier and his successor had rôles of major importance.

No attempt was made to assume any specific course of events which led to the infection of pasteurized milk in the M and N plants. Several hypothetical channels of readily recognizable causative potentialities may be listed as follows:

Infection of the milk holding tank by plant employees operating in the pasteurizing room, followed by incubation in the tanks. Lapses in heat treatment of the tanks resulting in failure to sterilize them. Infection of the pasteurized milk and lack of destruction of typhoid organisms because of low temperatures in the first milk and resulting in the infection of the foam. In addition, leakage of this first underheated and possibly infected milk through outlet valves and possible incubation in the pipe lines. The relation between lapses in hot cleaning and pasteurizing temperatures shows most striking correlations with the rises and declines in the outbreak and its recrudescence.

The regenerator also played a potential rôle in both infection and the incubation of any already infected pasteurized milk under certain conditions of operation. It, in itself, could have been directly infected, as typhoid carrier "C" was immediately responsible for its preparation for the day's run every morning he was on duty. The infection could also have readily incubated in it during the run or by reason of lapses in hot cleaning during the night.

The cooler, handled and especially as subjected to gross treatment during use by the typhoid carrier, could have been infected with resulting incubation and heavy inoculation of

the milk. Incubation of colon bacilli was proved in the cooler on surfaces, the drippings from which went into the pasteurized milk.

Cream might have contributed to the second outbreak by becoming infected in a milk storage tank, and by subsequently infecting the milk through a leaking valve in a connecting line, or by the passage of milk through a pipe previously used for cream. The infected cream itself may have been responsible for a certain number of cases.

While these possibilities are specifically listed, the epidemic may have been caused by a combination of them or by other unrecognizable factors operating within the plants.

In consideration of the possible rôle of country infected raw milk in the causation of the outbreak it may be said that while there were shown to exist potentially dangerous pollutions of utensil wash water supplies employed at some of the country receiving stations of the M and N Companies, diligent search for centers or individual typhoid cases in the country milk sheds of the M and N Companies failed to re-

veal any origins earlier than the time of the fully established outbreak in the city or having any direct causal relation thereto. The few cases suspected of such a relation were given special consideration and nothing was found to warrant attributing the causation of the outbreak to them. Also the records of the M Company indicated satisfactorily that no diversion of raw milk from the process of pasteurization occurred during the period of the epidemic. Even if raw milk in substantial amounts had been so diverted and distributed without pasteurization, it would have been subjected of necessity to some of the conditions found to afford ample opportunities for the typhoid infection of the pasteurized milk in the plants.

The evidence found has been wholly on the side of the infection and probable incubation of pasteurized milk and/or other dairy products distributed by the M and N Companies as the causative factors of the primary outbreak and its recrudescence.

NOTE: Full report published in pamphlet form by the Provincial Bureau of Health of the Province of Quebec, Quebec, Canada.

## THE STATE BOARD OF HEALTH OF MISSOURI

### DIVISION OF PUBLIC HEALTH ENGINEERING AND SANITATION

### RECOMMENDED SPECIFICATIONS COVERING SANITARY CONSTRUCTION FEATURES OF DRILLED WELLS

(Revised 1932)

1. *Samples of Cuttings*—At least 1 week before starting to drill the well, the driller shall send a written request to the State Geologist, Rolla, Mo., who will furnish a set of small sacks, a drill record book, and a letter of instructions regarding the collection and handling of drill cuttings. The well driller shall save a sample of cuttings from every 5 ft. and place them in the sacks, properly labeling same. These cuttings shall be taken from the *driller* and not from the slush pit. The sacks containing the cuttings shall be sent to the State Geologist at Rolla each day until the casing is set, after which they shall be sub-

mitted weekly. These cuttings shall be examined by the State Geologist or his assistants.

2. *Casing*—Upon the basis of available records, the State Geologist will recommend the depth of casing advisable to shut out effectively surface water and shallow ground water that may be contaminated. The casing shall be extended to at least this depth, and deeper if necessary, so as to case off all openings or soft or broken ground. When the drill hole reaches the depth at which the casing shall be set as recommended, drilling shall cease until the casing is set and the seal has been tested to demonstrate that it is water-tight.

The well shall be cased with a screw joint steel or wrought iron pipe of corresponding size and weight of casing, installed in a water-tight manner. The pipe or casing shall conform to the following minimum specifications for weight and thickness:

Size Inches	Thick- ness Inches	Wt. (lbs.) per ft. with Threads and Couplings *	Threads per inch
4	0.23	10.8	8
5	0.25	14.8	8
6	0.28	19.1	8
7	0.30	23.7	8
8	0.32	28.8	8
9	0.34	34.1	8
10	0.36	41.1	8
11	0.37	46.2	8
12	0.37	50.7	8

\* This weight is based on 20-ft. lengths. A 5 per cent variation is permissible.

When the water is known or suspected to be corrosive, the casing shall be of corrosion-resistant material and shall be protected from the action of corrosive waters. In order to protect the casing, the hole shall be thoroughly mudded with clean mud-laden fluid or preferably the casing shall be sealed by the use of cement applied in an approved manner. The cement shall be placed between the outside of the casing and the wall of the hole throughout the entire length of the casing or at least through those horizons which yield highly mineralized water.

The well casing shall be extended to a point not less than 6 in. above the elevation of the finished pump room or pump pit floor, and shall be provided with a thread at the top.

3. *Seal*—A satisfactory seal shall be made or installed at the bottom of the casing by one of the following methods:

(a) Setting the bottom of the casing on a shoulder in the well made by reducing the size of the drill hole, and sealing with a lead packer or cement grout applied by an approved method. An approved method of sealing the casing with cement requires that the cement be forced up behind the shoe several feet.

(b) Driving or rotating the casing into clay, shale or similar sealing formation.

(c) Installing an expanding rubber packer.

The seal shall be tested by bailing out the well and making sure that there is no leakage into same over a period of not less than 12 hours. When cement grout is used for sealing

the casing, the test for leakage shall not be made until the cement grout has set up. When no appreciable amount of water has been encountered up to time of sealing, a sufficient quantity of water to fill the space between the casing and drill hole shall be run into the annular space on the outside of the casing to test the seal.

The well casing shall be tightly sealed to prevent the downward percolation of surface water or other undesirable waste around the outside of the casing. This can be accomplished by thoroughly puddling the space between the outside of the casing and the wall of the hole with clay and sealing the upper 5 ft. with concrete. Whenever a gravel wall well or gravel packed well is constructed the outer casing shall not be removed from the hole but upon the completion of the well it shall be sealed in place in the usual manner.

4. *Water Analysis*—When a waterbearing stratum, furnishing the required volume of water, is encountered at a satisfactory depth, samples of water shall be collected at the end of the test pumping run and submitted to the State Board of Health, in containers provided, for complete chemical and bacteriological analyses to determine the suitability of the water for a general city supply.

Before setting the pump for the test run, the well shall be thoroughly disinfected with calcium or sodium hypochlorite. In case the permanent pump is not used for the test run, the disinfection shall be repeated just previous to the installation of this pump. Disinfect the well with fresh dry chlorinated lime (also called calcium hypochlorite or bleach powder) made into a solution as follows:

(1) Two pounds of the disinfectant shall be used in order to assure satisfactory results.

(2) Make the powder into a smooth paste with a small amount of water, crushing out all lumps.

(3) Dissolve the paste in about 2 gal. of water.

(4) Allow solution to settle; pour the clear solution into the well; and if possible mix with the water in the well.

(5) Allow the solution about 2 hours' reaction time before pumping the well.

Other prepared chlorine compounds may be used as a substitute for chlorinated lime provided sufficient quantity is used to make available 0.5 lb. of free chlorine.

5. *Records*—The driller shall note in the drill record book the location and depth of any openings or soft or broken ground encountered, together with complete information on the depth of casing, method of sealing same, and result of seal test. Also, the driller shall note in the drill record book the depth at

which water is encountered, the static water level as the drilling progresses and at the completion of the well.

Immediately on completion of the well, and prior to completion if requested, the driller shall forward all samples of cuttings not previously submitted and the drill record book to

the State Geologist, who will correlate same and furnish the owner with a copy of the completed log of the well.

6. *Approval*—These specifications shall be carried out in a manner satisfactory to the State Board of Health of Missouri, before this portion of the work is accepted.

## RECOMMENDED SPECIFICATIONS COVERING SANITARY FEATURES IN THE INSTALLATION OF WELL PUMPING MACHINERY (Revised 1932)

A. The use of a well pit or subground-level pump room shall be avoided wherever practical on account of the possibility of stoppage of the drain or ejector and neglect to replace the well top seal after making repairs.

B. Where the pump is installed without a pit—

1. The pump shall be installed on a concrete base of sufficient height to permit the outside casing to extend not less than 6 in. above the pump room floor, and to enable the installation of a suitable connection as noted under B-2.

2. The annular opening between the outside casing and pump column shall be closed by means of a suitable water-tight connection which will effectually prevent waste water, oil, insects or other contaminating material from entering the well.

C. Where the pump is installed with a pit or in a pump room below the ground level—

1. The sides and bottom of the pit or pump room, below the ground level, shall be constructed of water-tight concrete. The pit shall be left uncovered to permit easy inspection by the pump operator, and shall be surrounded by concrete curb at least 6 in. high and a pipe railing.

2. The annular opening between the outside casing and pump column shall be closed by means of a water-tight connection capable of withstanding for 24 hours, without leakage, the water pressure resulting from complete filling of the pit with water. The types of connections approved are given below in order of preference.

a. An all flanged or threaded connection.

b. A stuffing box connection.

c. Metal to grouted cement connection with suitable gasket (not rubber); to be used only when joint carries weight of pump column and the pump is rigidly supported to prevent vibration.

Any vents provided for the well shall be

extended by a pipe with screw or flange connections to a point above the floor level. A return ell shall be screwed on the upper end of this pipe, and screened.

3. Drainage shall be provided for the pump pit or pump room by one of the following methods:

a. By means of a drain consisting of a sewer pipe, not less than 6 in. in diameter, with cemented joints, installed in a straight line and on an even grade of not less than 0.6 ft. per 100 ft., with a concrete bulkhead at the outlet to insure an open discharge at all times; provided that under no conditions shall this drain receive sewage, or be connected to a sewer, and that the bottom of the pit so drained shall be above the high water level in any adjacent watercourse.

b. By means of a pump or ejector drawing from a sump of not less than 12 cu. ft. capacity situated so as to collect all waste water. This pump or ejector shall operate automatically or be connected to some moving part of the pump head, so as to operate continuously with this pump, and shall discharge above the pump room floor level into a suitable drain at a point safely removed from the pump pit or pump room.

4. The bottom of the pit or pump room shall be sloped away from the top of the well casing toward the drain or sump with sufficient grade to insure ready flow. At least 12 in. difference in elevation shall be provided between the top of the well casing and high water level in the sump.

D. A separate pump column, suction or discharge pipe shall be installed inside the well casing in all instances, whether the well is to be pumped by suction, air lift or deep well pump.

E. These specifications shall be carried out in a manner satisfactory to the State Board of Health of Missouri, before this portion of the work is accepted.

# INDUSTRIAL HYGIENE

**The Ventilation of Factories and Workshops**—Section 7 of the Factory and Workshop Act, 1901, requires that in every workroom in a factory or workshop sufficient means of ventilation must be provided and maintained, with certain further special conditions to meet certain special hazards. There is, however, a more important provision, under Section 79 of the Act, which enables the Secretary of State to make such regulations as appear to him to be reasonably practicable and to meet the necessity of the case. Injury to health must be shown to exist in a particular manufacture or process, as in a report from one of the medical inspectors. In the case of dispute and where the matter cannot be settled by conference with all parties concerned, the draft code must be referred to an arbitrator appointed by the Secretary of State. Many codes of regulations relating to different industries and processes have been established in this way.

Various codes provide for at least 6 changes of air per hour in an ordinary workroom, but cannot of course be applied to workrooms ventilated only by natural means. Yet, in warm weather in small and moderate sized rooms, provided the windows or other ventilators are of sufficient size, properly distributed and freely used, the air will normally be changed more than 6 times per hour. Often the area of window opening is too small; at least 5 sq. ft. of opening per 100 sq. ft. of floor area should, if possible, be provided.

In dealing with injurious dust, gas or vapor rising from manufacturing processes, 3 methods of prevention obtain: (a) fully enclosed machines, (b) damp processes, and (c) mechanical extrac-

tion.—Leonard Ward, *J. Roy. San. Inst.*, 52, 5: 196–200 (discussion 214–216) (Nov.), 1931.

E. R. H.

**Air Conditioning Hut**—Starting with the air in the hut cool and still, it is made to circulate among the visitors present by starting the fan, which increases the sensation of coolness although the actual temperature of the air remains the same. By standing between the electrically heated panels, however, the body receives radiant heat, which compensates for the heat delivered up to the moving air, and this combination of radiant heat with air at a comparatively low temperature moving at a reasonable velocity produces a very favorable sensation.

As soon as humidity is produced by means of steam jets, the temperature of the air is also slightly raised owing to the introduction of steam and there is at once a feeling of lassitude as the cooling power of the air is reduced (sufficient heat is not removed from the body). Starting the fan under this condition immediately gives a sensation of comfort although the temperature and humidity remain the same as before. If the fan is stopped and humidification continues to a point at which fog is produced, the atmosphere becomes oppressive but there is immediate relief in again starting the fan.

By keeping the air in circulation through the convection heaters, its temperature gradually increases, which causes a fall in the relative humidity, but so long as the air is moving the conditions are pleasant. In contrast, under the same conditions of humidity and temperature but with still air, discomfort is felt. If at this point the hu-



midity is increased, the discomfort is increased, as there is produced an atmosphere which is both very warm and very humid, and without air movement. The pulse rate and the breathing rate are found to increase, but if now the fan is started there is a general feeling of relief, the breathing becomes more free and yet the temperature and humidity have remained the same.

When the warmed and humidified air is allowed to remain stagnant for a few minutes, there is a considerable difference in temperature at different levels. The upper air is much warmer than the air near the floor. This condition produces an uncomfortable feeling of oppressive warmth round the head and coldness of the feet.

The principles emphasized in the hut demonstration are capable of wide application in industry. It is shown that for both comfort and efficiency the heat removed from the body must balance the heat produced when working. An atmosphere incapable of removing sufficient heat can be improved if the air is kept in motion. Where the heat loss from the body is excessive the remedy is a supply of radiant heat.

The air conditioning hut has served the useful purpose of bringing these facts to the notice of employers and others who had been unable to produce satisfactory conditions, consistent with the carrying on of manufacturing processes by the application of older ideas of ventilation.—Hilda Martindale, Home Office Industrial Museum, *Annual Report of the Chief Inspector of Factories and Workshops* (Great Britain), 1930, pp. 78-81.

E. R. H.

**Ventilation as a Physiological Problem**—Ventilation, derived from the Latin *ventilare*—"to fan"—means no more than the maintenance of air movement. Nevertheless, the common conception of effective ventilation is that of an adequate supply of fresh and

of pure air. The widespread belief in the necessity for freshness and purity of the ventilating air has held until recent times. It is now realized that the chief function of ventilation is the provision of such an external environment that the body may, in its turn, maintain the physiological integrity of its internal environment—and that with the minimum of strain.

In a series of experiments, Leonard Hill in 1913 finally disposed of the claim advanced that expired air contains injurious organic matter other than bacteria.

Even when at rest, the human body produces no inconsiderable quantity of heat, and all excess must be got rid of; otherwise ultimate destruction of the body occurs more surely and more rapidly than with the retention of any other waste product. At least three-fourths of the heat produced in muscular effort is a waste product to be removed; otherwise heat stroke may ensue. The more subtle or premonitory stage of heat-stagnation is less obvious and is also more frequent. The strain is thrown on the cardiovascular system, while warm moist atmospheres also affect the mucous membranes of the respiratory tract.

Clothing aggravates the stagnation of heat. The part which clothing may play in the heat loss of the body is of paramount importance. It is the beneficial effects of air movement which are largely negated by unsuitable clothing. A human being is able to adjust himself to his surrounding within fairly wide limits and also has power of acclimatizing himself. In still air the sensory nerves of the skin are not stimulated, by which an increased rate of sweat production is brought about in acclimatization.

Orenstein and Ireland showed that the efficiency of natives in the Rand mines was greatly improved by increase in the cooling power of the environment. For

sedentary work, the dry kata-thermometer should be 6, for light muscular work 8, for heavy muscular work 10, while corresponding figures for the wet kata are 18, 25 and 30, respectively. Many other investigators have found similar kata conditions necessary.

The new orientation in the scientific attitude to ventilation seems to be thoroughly justified both by physiological experimentation and by practical experience in industry.—R. C. Garry, University of Glasgow, *J. Roy. San. Inst.*, 52, 5: 208–213 (discussion 214–216) (Nov.), 1931. E. R. H.

**Vaccine in the Prevention of the Common Cold. An Experiment—**An experimental study was made to determine the effects of vaccination on the incidence and duration of common colds. Eighty medical students were vaccinated with a prepared, partially detoxicated vaccine, and 82 medical students acted as controls.

The statistical results of the experiment show little, if any, improvement as regards common colds in the experimental group as a whole compared with the control group. Individuals in the experimental group appear to have received some benefit. This is in accord with the findings that the group as a whole was not completely desensitized to the particular antigens used. Better results may be possible with an increased dosage of the vaccine or by employing with each individual the particular antigens to which he may be shown sensitive.—W. E. Brown, *Am. J. Hyg.*, 15, 1: 36–63 (Jan.), 1932.

E. R. H.

**Vasomotor Reactions to Localized Drafts—**When the unclothed body was exposed to uniform atmospheric conditions the average temperature of the skin varied directly with the effective temperature of the atmosphere. The skin temperature dropped about 1° C.

for every 2° F. drop in effective temperature.

Under uniform atmospheric conditions, the average skin temperature was 25.8° C. for *cold*, 29.5 for *cool*, 32.1 for *warm* and 33.5 for *hot*, while variations amounted to as much as plus 4 to minus 8.3 for *cold* to plus 1.9 to minus 1.6 for *hot*, depending upon the part of the body whose skin temperature was taken.

Under varying atmospheric conditions affecting the whole body uniformly, the temperature of the nasal mucosa followed that of the skin of the face, ranging about 3° below it. A localized draft on the head caused a fall in the skin temperature of the face and in the temperature of the nasal mucosa with less marked fall in the temperature of the mouth.

Chilling of the feet by local drafts did not materially affect the skin temperature of the rest of the body, but it caused a distinct rise in the temperature of the nasal mucosa. One subject showed entirely abnormal responses differing sharply from those found for the other six subjects.

The results correspond with those of Hill and Muecke, of Grant and his associates, of Azzi, and of the New York State Commission on Ventilation, in showing that chilling of the body surface results in contraction, and ischemia and dryness of the mucous membranes of the nose.

Nothing was found to indicate that localized drafts differ in respect to vasomotor reactions from uniform chilling of the body surfaces as a whole, or to suggest a special influence on respiratory infection. Chilling of the head caused less disturbance in the nose than exposure of the entire body to a corresponding effective temperature, while chilling of the feet actually caused dilation of the blood vessels of the nose and throat.

The experiments were carried out on a small group of normal young men

without clothing. While the effects of drafts at higher room temperatures might yield quite different results. The significant thing is that the investigation does not confirm the general belief that chilling of the feet is especially harmful.—C.-E. A. Winslow and Leonard Greenburg, *Am. J. Hyg.*, 15, 1: 1-35 (Jan.), 1932. E. R. H.

**Influence of Infra-Red Radiation in Relation to Ventilation and Heating**—Many people feel stuffy and uncomfortable in a closed room warmed by a plenum system, or by dark and dull red sources of heat. The feeling of stuffiness has been attributed to some unknown X quality of the air, to its ionization, or to addition of vapor arising from the roasting of dust particles on heating surfaces.

Some have thought that the air is made over dry, and have placed bowls of water on stoves or in front of the old-fashioned gas fire. No evidence of any significant alteration in the humidity of the air has, however, been forthcoming, and proof of significant change in ionization has failed to appear.

The conclusion to be drawn from personal experiments is that stuffy feelings are produced by dark or dull heat rays acting on the skin, and reflexly through the nerves of the mucous membrane of the nose. It is the longer infra-red rays which produce this effect, rays which are absorbed by a thin film of water, and which have almost no power of penetrating the outer surface of the skin. These rays are largely screened off from sunlight by the water vapor in the atmosphere, but are abundant in a green-house heated by sunlight since they are given off therein by the heated surfaces, hence the stuffy effect noted.

The close relation between the state of the skin and asthma is generally recognized. Some 60 per cent of asthmatics are said to suffer from some form of dermatitis, and many asthmatics are benefited by light baths. Storm Van Leeuwen has found that fan impulsion of pure dust-free air through their sleeping compartments relieves many asthmatics and chronic bronchitics. It may well be that the effect is not wholly due to dust removal, but partly to a cooling of the face, which antagonizes the dark heat rays in a closed room. By a ventilation of rooms, adequate to remove infecting microbes and prevent the congestion effect of long dark heat rays on the nose, I believe, the number of colds may be reduced. It is known that open air workers suffer very little from colds, and have a low death rate. Proper feeding with plenty of milk, butter, fruit and vegetables is, of course, also required to keep down infection. If the congestion and closing of the nasal passage is, as I think it is, a sign of ill ventilation, then it follows that enough cool air should be sent through every room to cool the face and counteract the effects of the long infra-red rays.

—Sir Leonard Hill, *J. State Med.*, 39, 12: 683-687 (Dec.), 1931. E. R. H.

**Factors in the Production of Nervous Lesions Following Electric Shocks**—In the present study rats were used as the experimental test animal. The author's summary follows:

When the current from a 1,000-volt alternating or continuous circuit was allowed to flow through the preparation for one second, abnormalities in the nerve cells of the brain or the spinal cord were demonstrated only in areas traversed directly by the current pathway. The electric current produced damage to nerve cells in experiments where heat production was negligible. If a large current flows through the body for a considerable time, there is marked heat production which causes changes in nerve cells indistinguishable from those produced by the electric current alone.

—Orthello R. Langworthy, *J. Indust. Hyg.*, 14, 3: 87 (Mar.), 1932. L. G.

# FOOD AND NUTRITION

**A Bacteriological Study of Decomposing Crabs and Crabmeat—**Bacteriological studies of Chesapeake Bay crabmeat were made on samples of crabmeat from Maryland and Virginia purchased on the open market, as well as on some whole live crabs. Spoilage experiments were conducted at room temperature and at refrigerator temperature. The author states that the decomposition is due to progressive proteolysis associated with a rapid increase in ammonia content. The predominating bacterial types encountered were the Gram-negative non-spore-forming bacilli, and the Gram-positive streptococci. Decomposition experiments in which sterile crabmeat was inoculated with pure cultures of *Proteus vulgaris* resulted in a proteolytic decomposition of the meat, with the pH changing from 7.0 to 6.8. In the spontaneous decomposition of crabmeat, the pH changed from slightly alkaline to pH 8.2–8.6.

The writer concludes that the decomposition was due primarily to the action of the *Proteus* group, possibly supplemented by some of the *Pseudomonas* and *Flavobacterium* groups. There apparently is no relation between the "age" of decomposition and total aerobic counts. There is no close relation between the "age" of decomposition and the pH value. Spore-forming anaerobes are not concerned in the decomposition. Spoilage at refrigerator temperature fails to show an increase in the *B. coli* score. Bacteria belonging to the following genera have been isolated: *Escherichia*, *Proteus*, *Zopfius*, *Alcaligenes*, *Flavobacterium*, *Achromobacter*, *Pseudomonas*, *Micrococcus*, *Sarcina*, and *Streptococcus*.

The delicate Nessler ammonia test is tentatively proposed as a means of detecting ammoniacal spoilage in crabmeat during the incipient stages before macroscopic signs of proteolytic decomposition are apparent. No correlation is made between the type of spoilage studied and the production of toxic substances.—Marvin M. Harris, *Am. J. Hyg.*, 15: 260 (Jan.), 1932.

**The Poisonous Principle of Lathyrus and Some Other Leguminous Seeds—**The seeds under consideration in this article are *Lathyrus sativus* and *cicera*; *Ervum lens* (lentils); *Pisum sativum* (the common cultivated pea); *Soya hispida* (the soya bean); *Vicia sativa* (tares); *Cajanus indicus* (the pigeon pea); and *Ervum ervilia* (the bitter vetch). In all these seeds the poisonous body is an acid and apparently the same acid in all. In large doses its action on frogs is always qualitatively the same, namely, depression of the brain and spinal cord, succeeded, if the dose be not lethal, by more or less increase of spinal reflexes, and the motor nerves are not paralyzed. The muscles are also poisoned, more especially in the area of the injection but also more widely through the blood. With very small doses the depression stage may be hardly noticeable and there is an equally slight increase of spinal reflexes.

Rabbits (herbivora) are very insusceptible, but with large doses show a certain amount of weakness of the legs.

In monkeys after a large or frequently repeated smaller dose, the symptoms broadly are those of depression and irritation of the brain and cord, but in detail they vary somewhat. Sometimes drowsiness and lethargy are very promi-

nent; sometimes weak tremors or coarse jerking of muscles, or clonic or tonic convulsions of groups of muscles in rapid succession and involving the whole body; sometimes a shaking palsy like paralysis agitans. But always there is marked paresis of the motor tracts and muscular weakness. The more powerful flexors and adductors overcome the extensors and abductors, giving rise to flexion of the joints and adduction of the limbs. One limb is often earlier and much more affected than the others. The chief effect, therefore, is on the cerebrum (fore-brain, motor areas and basal ganglia) and the spinal cord, but it is not always the same part which is chiefly affected and hence the considerable variation in symptoms.

In using 15 different lots of lathyrus it was found that they vary very greatly in toxicity, and this is probably true also of other peas and accounts no doubt for the cases of poisonings which have occurred occasionally among farm stock with soya meal, and with the bitter vetch and lathyrus itself. A lentil feeding experiment on a monkey shows that an individual sample may be very poisonous.

Like opium, coca, tobacco and many other drugs of the same kind, these leguminous seeds may be classed as stimulant-narcotics, that is, stimulants to the nervous system in small doses and narcotic in large doses, with the difference that they are capable of producing much more readily organic degenerative changes in the central nervous system. Fortunately, however, to do this very large amounts are required.—Ralph Stockman, *Brit. J. Hyg.*, 31: 550 (Oct.), 1931.

**Midday Meals for Preschool Children in Day Nurseries and Nursery Schools**—This is an important contribution from the U. S. Department of Agriculture giving the food value of typical nursery school menus and reci-

pes, in terms of the chemical composition of each child's portion of every dish. As the title suggests, the work is intended especially for persons responsible for feeding groups of preschool children one or two meals a day, but should be helpful in meeting the similar questions arising in hospitals and other institutions, and the question of food selection in homes where groups of young children must be fed.

In a pamphlet of 46 pages, the authors devote two-thirds of their space to a tabular showing of the chemical composition of the ingredients of recipes, in calories and in grams of protein, fat, carbohydrate, calcium, phosphorus, and iron. They include also a brief discussion of food standards for children, of factors affecting the child's food intake, such as appetite, food habits, and the mechanical problems involved in the child's manipulation and mastication of his food. Variations in the cost of menus are discussed, and examples of high and low cost menus for different months are given.—Mary E. Sweeney and Charlotte Chatfield, U. S. Dept. of Agr. *Circular 203* (Apr.), 1932.

**Polycythemia in the Rat on a Milk-Iron-Copper Diet Supplemented by Cobalt**—Thirty albino rats, 21 days old, were placed in glass cages with their mothers and fed whole milk until the 25th day. After 4 days the mothers were removed and the young rats were then placed in individual glass cages and given a basal diet of whole milk with 0.5 mg. of iron, plus 0.025 mg. of copper daily. At the end of 30 days, manganese, cobalt, nickel and zinc were added. These were fed as solutions of soluble salts and at the following levels: manganese 1.0 mg. as  $MnSO_4$ , cobalt 0.5 mg. as  $CoCl_2$ , nickel 1.0 mg. as  $NiSO_4$ , zinc 0.5 mg. as  $ZnSO_4$ . Cobalt as  $CoSO_4$ , in the amount of 0.5 mg., was fed and the results are identical with those obtained with  $CoCl_2$ .

All animals receiving the cobalt presented a striking appearance. The ears, eyes and paws became a deep red color in contrast to the pink color of the rats of the non-cobalt and normal groups. As long as cobalt was administered the polycythemia persisted. Two animals were kept polycythemic by cobalt feeding (0.5 mg. of cobalt as  $\text{CoCl}_2$  daily) for a period of 330 days.

There was only 1 fatality and that was an animal which grew well until 2 weeks before death, which occurred at 220 days of age. Hemoglobin, erythrocyte and cell volume values show a parallel rise, while the leucocyte and differential leucocyte counts show no significant alteration.—James M. Orten, F. Aline Underhill, Edward R. Mugrage and Robert C. Lewis, *J. Biol. Chem.*, 96: 11 (Apr.), 1932.

**The Iron Content of Vegetables and Fruits**—Data are given in this report on the iron content of 110 different forms, parts, or varieties of fruits and vegetables, for 82 of which some analyses were made by the author. Twelve of the 110 averages represent dried or mature plant products, and 98 refer to

fresh, succulent, or immature plant products. Four classifications were made of the 98 fruits and vegetables tested:

Group 1—13 were found to contain less than 0.00040% of iron and were considered poor sources of iron.

Group 2—44 contained 0.00040% to 0.00079% and were considered fair sources of iron.

Group 3—24 contained 0.00080% to 0.00159% and were considered good sources of iron.

Group 4—17 contained 0.00160% or more, and were considered excellent sources of iron.

The first group consisted almost entirely of fruit and fruit juices. About one-half of the second group consisted of seed pods, blanched leaves, roots and bulbs. In the third group, potatoes and thick pigmented stalks and leaves were of chief importance. In the fourth group, immature seeds of leguminous plants and thin green leaves were of importance, the latter being conspicuous for their iron value. The classification shows, as has often been observed, that much of the iron in plant tissue is associated with the chlorophyll.—Hazel K. Stiebeling, U. S. Department of Agriculture, *Circular 205* (Feb.), 1932.

# CHILD HYGIENE

## PREVENTION OF CRIPPLING IN CHILDHOOD

A REPORT of the Committee on Prevention and Research of the International Society for Crippled Children, which was presented recently at the meeting of the society at Rochester, N. Y., is of sufficient current interest to give certain excerpts in these comments.\*

Wherever, in different parts of the country, the ravages of epidemics, increases in child labor, and the onslaught of depression have been felt, an effort has been made to secure authentic information regarding the status and value of combative measures used. A study of recent literature depicting the laboratory findings of those engaged in searching out means of prevention has been made. . . .

### POLIOMYELITIS

One of the most baffling epidemics has been poliomyelitis. At times we have thought we knew something about the type of conflict this enemy would offer. But we have learned that, although its mode of attack is essentially the same, the strategy of its attacks varies. Consequently it continues to take heavy toll of children's lives and to leave many wounded and crippled upon the field. Dr. R. I. Harris of Toronto estimates that it is one of the most important causative factors of crippling, averaging 40 per cent of the cases, while tuberculosis follows with an average of 30 per cent. In the year of 1931 there were reported some 13,000 infantile paralysis cases, one-third of which occurred in New York City. . . .

Epidemiologists are of the belief that there are many more unreported cases of infantile paralysis than are reported. As in other communicable diseases, it is believed there are many mild and abortive cases. . . .

A germ that cannot be captured is extremely difficult to study. Nevertheless, what it does or does not do can be brought under observation. It has been established that one who emerges the victor after one attack is im-

mune to others. This led to the hope that the blood of such cases might help counteract the disease in other individuals, striking a spark of hope that a positive serum had been found. Recent experiments, however, have not fanned that spark into a flame as yet. Two difficulties have been met. One is to produce the serum in sufficient quantities for widespread use in the face of an epidemic, as its preparation in animals has not been perfected, and another is to discover or be apprised of the illness early enough for the serum to be effective. . . .

Treatment so far has been, for the most part, the injection of serum. At first it was believed that only the serum from convalescents could be used, and as this could not be secured in great quantity the amount to be administered was limited not only as to quantity, but as to the type of patient to receive it. . . . All the various forms of infantile paralysis can be reproduced in the monkey by injecting, under suitable conditions, extracts of the spinal cord of patients who have died of poliomyelitis. It has also been found that the serum to be used does not need to be taken from the blood of the convalescent immediately. It can be preserved in the laboratory under proper conditions for months and even a year or two without losing its effect, it has been stated.

More recently the blood of so-called normal persons has been thought to carry neutralizing substances, for the virus of infantile paralysis. Although according to Wywer, Park, and Banzhof, in the April, 1931, issue of the *Journal of Experimental Medicine*, while "Pooled serum from 'normal' adult donors has proved effective in neutralizing virus, its potency is approximately one-half that of convalescent serum." . . .

There has been a tendency to attribute to rural sections the greater prevalence of this disease. However in 1930 Ohio reported that 61 per cent of its cases were urban and 39 per cent rural. The *Weekly Bulletin* of the City of New York Department of Health for August 22, 1931, states that if the epidemic year of 1916 is excluded only a slight rural preponderance is found—not different from that of whooping cough.

Dr. Park seems inclined to view isolation as

\*A copy of the full report embodying recent bibliography may be obtained from the Cleveland Child Health Association at a cost of 5 cents.

not very valuable after the early acute stages, saying that many cases are so treated after the danger is passed. Most of us, however, would probably be inclined to agree with Dr. Parran, New York State Health Commissioner, who says, "In the absence of any better known method of combating infantile paralysis, the New York State Department of Health will continue to recommend the use of human serum unless its usefulness should be completely disproved." . . .

In Boston the Harvard Infantile Paralysis Commission, which has been functioning since 1916, was vigorously active, spotting cases and collecting serum. New York City appropriated \$75,000 emergency funds. A battalion of orthopedic nurses was concentrated in Brooklyn to care for anticipated cripples. Stations were set up to take blood from convalescents for the treatment of infantile paralysis.

At the end of the infantile paralysis season, 3 Stanford University men, Dr. Charles Egloff Clifton, Edwin William Schultz, and Louis Philipp Beghardt, announced that they had isolated and measured an organism which they were certain caused infantile paralysis. . . .

The studies of Dr. Frederick Eberson at the University of California are of interest. He has been able to segregate germs and produce a serum that checks infantile paralysis in monkeys, he reports, though he is not prepared to vouch for its success with human beings. Convalescent serum has also been collected and distributed by the Hooper Research Institute of the University of California.

Edna Foley, a member of this committee, says, "I am not sure we know any more about the prevention of poliomyelitis than we did but certainly we know a lot more about the prevention of deformity, the protection of weakened muscles, and the restoration of strength to paralyzed muscles by proper treatment." . . .

An interesting method of treatment is advocated by Dr. Henri Bórdier, of Lyon, France, consisting of the association of spinal radiotherapy and diathermy administered to the affected limbs, with the addition, where necessary, of galvanization of the atrophied muscles. Hydrotherapy, as tried in various places, is proving of value too. . . .

#### TUBERCULOSIS

Regarding tuberculosis of the bones and joints, Dr. Maxwell Harbin of Western Reserve University sounds an optimistic note, "To date there has been a steady decrease in incidence of tuberculous disease of bones and joints in childhood, although it is my impression that there has been an increase in the

incidence in adults. It would seem that the children have perhaps been protected partly by public health measures and that we are beginning to reap benefit from this source. Later, perhaps, with the letting down of public health activities, which may occur as a result of the depression, this situation may be changed."

This opinion is held by a number of other investigators throughout the country. Certainly not so many or so serious cases of tuberculous bone and joint disease are seen in the wards of our hospitals as were a decade or two ago.

Preventing young children from coming into contact with the tubercle bacilli is the best means of prevention. Inasmuch as the two sources of the bacilli are known, the matter of prevention may appear, superficially, to be a fairly easy one. The human source is the most common one, and in many respects the most difficult to find and handle; the bovine source, which is responsible in some places, it is estimated, for between 10 and 15 per cent of the tuberculous joints and bones, should be watched more carefully. General pasteurization of milk supply eradicates a large percentage of this danger. But pasteurization is only adequately accomplished, as a rule, in large centers. In smaller towns and rural sections of the country there is more danger from bovine tuberculosis. The eradication of bovine tuberculosis has been aided by the combined efforts of federal and state governments until a decrease in the per cent of cattle reacting to tuberculin has decreased by more than half in the past 15 years. Nevertheless, it is still estimated that in cases of children under 5 years of age, suffering from tuberculosis, 21 per cent are caused by the bovine type of infection; in cases between the ages of 5 and 16 years, 26 per cent are of this type. . . .

It is recognized that other communicable diseases may account for some of the crippling, but these bear a very small proportion of the total. Syphilis now comes under surveillance earlier than formerly and is more intensively treated. Diphtheritic paralyses are gradually fading out of the picture due to the exact knowledge we have of this disease as to cause, prevention, and cure.

#### CEREBRAL PALSIES AND BIRTH INJURIES

While there is some scattered experimentation of promising value going on at present for the prevention of cerebral palsies and birth injuries, little of note has appeared concerning these subjects the past year. Dr. Maxwell Harbin says, "The prevention of Erb's and Erb-Duchenne's palsies lies largely



in the realm of the obstetrician who delivers the child. Certainly with the exercise of due care a tremendous number of these injuries may be avoided. Therefore, it would seem that propaganda relating to the obstetrician is most important. It should be emphasized in the teaching of medical students as well as the instruction of internes in hospitals where there is an obstetrical service." Full consideration to this phase of the subject is given in the White House Conference on Child Health and Protection reports. Dr. Harbin says further, "Recognition of the presence of a contracted pelvis in the female before birth is of tremendous importance in prevention, as well as the very careful supervision by the obstetrician of the female primipara during pregnancy and labor. Even with close observation it is next to impossible to differentiate between cerebral damage resulting from actual laceration of the brain tissue and damage resulting from pressure by hemorrhage. It is possible that early craniotomy may result in some relief from the latter class although it has seemed impracticable and has not been practised to any extent to date."

Dr. Helen MacMurchy believes, "It would seem that the chief means of prevention of these injuries is in better obstetrics and in the better education of the public. Medical students in their undergraduate courses and medical practitioners in postgraduate courses need more satisfactory instruction, especially in regard to the dangers of instrumental interference. The general public needs education in regard to the danger of instrumental interference and the danger of pressing on the medical attendant, against his own better judgment, injudicious means to hasten the occurrence of birth."

Dr. E. C. Hartley thinks that while the question of birth injuries "may be met in part by better obstetrical care, there is still a background of which at present we know nothing, but which must be understood in order to make any great impression upon the incidence of birth injuries." He refers to "a peculiar susceptibility which some children appear to have for injury at birth," into which he believes "some constitutional or other factor enters to render some children more liable to birth injury than others." . . .

Dr. Fred L. Adair has been studying the subject of obstetrical birth injuries, in Chicago, and at Harvard, Bronson Crothers has been interesting himself in the neurological aspects of such injuries. Neither of them has completed his work, but the quality and extent of their investigations promise much for future preventive methods.

#### RICKETS AND NUTRITIONAL DISORDERS

Deformities from rickets are among the most common and, at the same time, the most needless of any known. That the present period will see an increase in this type of crippling seems not at all improbable, although education has increased widely the use of protective means up to this time. At one health center in New York City, where the per cent of undernourished children has been carefully diagnosed during the past 3 years, it is reported that malnutrition has increased from 18 per cent to 60 per cent since 1928. Public health nurses report that their work is handicapped because parents cannot provide their children with the diet recommended. In Louisville, Ky., one agency reports a decrease of 1,000 in the number of children able to meet the health and weight standards . . . Any extensive data regarding conditions arising from malnutrition cannot be secured at present, and perhaps it will be difficult to do so at the close of the present economic period. There can be little question, however, regarding the findings of school examiners, pediatricians and general practitioners in this respect during the coming years.

Methods of preventing rickets have been under investigation since Glisson's work on etiology in 1650; Mellanby's work in 1918 on antirachitic factor or vitamin was followed by the demonstration of Huldshinsky in 1919 of the curative value of ultraviolet rays of the mercury vapor quartz lamp. The preventive and curative value of this treatment has also been thoroughly proved by Gerstenberger, and others. Hess and Unger made the observation in 1921 that sunshine has a similar action on rickets; the following year McCollum, Simonds, Becker and Shipley proved the existence of vitamin D and that cod liver oil was its most concentrated source. Next came the discovery that food containing cholesterol or allied substances could be activated by ultraviolet rays and given antirachitic property. . . .

Unobstructed sunshine is the cheapest and most effective of any of the elements discovered. But in smoky, foggy cities the alternative is diet control and the use of potent cod liver oil. The ingestion of a diet rich in calcium, phosphorus and vitamin D usually results in a definite change within a period of from 10 days to 2 weeks. The ultraviolet lamps on the market should be used with caution and under the direction and supervision of a physician. . . .

#### CHILD LABOR

The Committee on Education and Training

of the White House Conference learned that, "Although 15 states and the District of Columbia apply the minimum age provisions to all gainful employment, and 28 to a more or less comprehensive list of employments, 5 set no minimum age except for employment in factories and certain dangerous or hazardous occupations, and 2, none except for certain dangerous and hazardous occupations. The various kinds of domestic and personal service, agricultural work and factory work in the home are usually unregulated by child labor laws. In some states canneries are exempt from the operation of the child labor law. . . ."

Agricultural occupations are the most difficult to regulate. While many agricultural tasks are light enough for children, they are often kept at them for periods of anywhere from 8 to 12 hours at a time. Certain types of farm work involve cramped positions for the workers, exposure to dampness and cold, and danger in the use of machinery. Furthermore, there are the migratory farm workers, who travel from place to place, following the crops and seasons, whose living conditions are usually bad, being often unsanitary labor camps. . . .

Inasmuch as child labor is considered to be largely forced by another of the child's enemies, poverty, it is not improbable that an increase of illegal employment of children is occurring at present. In so far as it is possible to bring about a solution of the problems of adult employment, unemployment insurance, and other matters concerned with establishing decent standards of living, general progress toward a reduction of child labor will be made. It is the recommendation of the committee that those concerned with child welfare bear this in mind. On the other hand, many children who have left school to become employed are unable to find work at present, and a more careful observance of school attendance laws will no doubt return many of them to school. . . .

Another suggestion the committee would make is that statistics of injuries to minors be kept more accurately, and separately from other figures, in order that comparable facts may be presented to a public that should be well informed. Most of all, the committee is in agreement with the findings of the White House Conference, that a national minimum standard regulating the employment of minors should be established in order to eliminate the

inequalities and injustices existing between the differing laws of the states.

#### ACCIDENTS

Safety campaigns have been in evidence for some time. The greatest efforts have been directed toward schools, for it is there that the child is most available and open to all kinds of education. In 1931 a *Guide Book for Safety Education*, with a foreword by William John Cooper, U. S. Commissioner of Education, was published with the aim of offering school children, from the kindergarten up, interesting educational material on safety. In larger cities school patrols have become a part of the regular policing function, and in some rural communities they are coming into use.

In spite of the precautions taken, statistics from many parts of the country reveal that the highest average of accidents in any age group is found among children under 16 in trade, and next, among accident-causes, automobiles and other motor vehicles have the highest severity. Machinery has caused the greatest number of accidents it is reported in Illinois, and also in Ohio, among employed minors the past year. The Metropolitan Life Insurance Company states in its *Bulletin* of October, 1930, that of automobile accidents involving 100,027 pedestrians 17 per cent were children struck at play in the streets. . . .

Although a survey, during 1931, of the efforts to prevent crippling in children is both enlightening and encouraging, it does not fail to warn that such advancement as has been made has been at the expense of continual vigilance. The mighty arm of progress must strike here and there at ignorance, carelessness, thoughtlessness, if the day is to be won for the child.

While the report is confined largely to crippling viewed as physical disability of the trunk and limbs, the committee is fully aware that it has much wider implications. Crippling in its widest sense should include children who are seriously malnourished, partially or wholly blind or deaf, and those who have major deformities of the lips, jaws, or teeth. To these might well be added the cardiac cases and those suffering from pulmonary tuberculosis. All of these, however, are considered in detail by other national and local organizations, and much worthwhile literature is available regarding the extent, causes, prevention and cure of disabling conditions.

# PUBLIC HEALTH NURSING\*

## RESULTS OF ELECTION AT THE BIENNIAL NURSES CONVENTION IN APRIL

### *American Nurses' Association—*

#### *Officers*

President, Elnora E. Thompson, Portland, Ore.

1st Vice-President, Mabel M. Dunlap, Moline, Ill.

Secretary, Susan C. Francis, Philadelphia, Pa.

Treasurer, Emma M. Nichols, Boston, Mass.

#### *New Directors*

A. Louise Dietrich, El Paso, Tex.

May Kennedy, Chicago, Ill.

Elizabeth Soule, Portland, Ore.

### *National League of Nursing Education—*

#### *Officers*

President, Effie J. Taylor, New Haven, Conn.

1st Vice-President, Nellie Hawkinson, Cleveland, O.

2d Vice-President, Julie C. Tebo, New Orleans, La.

Secretary, Stella Goostray, Boston, Mass.

Treasurer, Marian Rottman, New York, N. Y.

#### *New Directors*

Elizabeth C. Burgess, New York, N. Y.

Katherine Densford, Minneapolis, Minn.

Shirley Titus, Nashville, Tenn.

A. Louise Dietrich, El Paso, Tex.

### *National Organization for Public Health Nursing—*

#### *Officers*

President, Sophie C. Nelson, Boston, Mass.

1st Vice-President, Winifred Rand, Detroit, Mich.

2d Vice-President, Mrs. C.-E. A. Winslow, New Haven, Conn.

Treasurer, Michael M. Davis, Chicago, Ill.

#### *New Directors—Nurse Members*

Anne Dickie Boyd, Denver, Colo.

I. Malinde Havey, Washington, D. C.

Marian G. Howell, Cleveland, O.

Marguerite A. Wales, New York, N. Y.

#### *New Directors—Sustaining Members*

Mrs. Chester Bolton, Cleveland, O.

Mrs. J. L. Brock, Bryan, Tex.

Frank W. Walker, New York, N. Y.

National Biennial Nursing Convention—Even the weather did its best to make the joint biennial convention of the American Nurses' Association, the National Organization for Public Health Nursing, and the National League for Nursing Education, held in San Antonio, Tex., April 11–15, one of the pleasantest as well as one of the most profitable conventions these groups have held. Over 2,600 members and delegates of the three organizations were adequately and comfortably accommodated in San Antonio's spacious new Auditorium, where general meetings were held, and

in its interesting and efficient hotels for special group meetings. The exhibits were particularly well planned from the standpoint of service and educational value.

The alleviation and prevention of the serious unemployment with which the nursing profession is faced was the great concern of this convention. The profession will continue to face a serious situation even in normal times due to the annual graduation of many thousands of nurses each year who are not needed. There is now, according to Dr. May Ayres Burgess, 1 nurse to every 63 families in the United States. The question was discussed from many angles, bringing out three suggestions for remedies: the limiting of the out-

\* The printed matter of other material relating to public health nursing to Eva P. MacDougall, 6 State House Annex, Indianapolis, Ind.

put of nursing schools, the more careful selection of students for the nursing school and the distribution of various kinds of nursing service to meet the needs.

The members of the National Organization for Public Health Nursing are particularly concerned with the training of nurses for public health nursing and their continuous education to meet the ever changing, ever developing demands of the field in which they are working. Do results justify the expense of our staff education programs? Can we maintain the present program? Are organizations assuming responsibility in public health nursing education which should be assumed by the individual nurse? These, according to Ellen Buell, Director of the Department of Public Health Nursing, Syracuse University, are pertinent questions at a time when all community supported projects are being scrutinized as never before.

Much emphasis was placed on the utilization of the help lay people could give us as volunteer workers, board and committee members, and advisory counsel members for both official and non-official agencies, hospitals, nurses' registries, and nursing schools.

The highlight of the convention was the most impressive service in which Anne W. Goodrich, Dean of the Yale School of Nursing, was awarded, to the great delight of everyone interested in nursing, the Saunders' Medal for distinguished service to nursing.

One could scarcely help feeling throughout the whole convention the stress put on maintaining, in some ways perhaps regaining, that true spirit of nursing which has made it respected and appreciated through the ages.

Certainly no meeting has been more effectively handled than this one. The Texas sunshine, beautiful flowers, the unlimited hospitality of the Southwest, and the well planned and pertinent program made this convention one not to be

forgotten for its delight, inspiration and help.

By majority vote of the delegates the next biennial convention will be held in Washington, D. C., in 1934. V. A. J.

**A Parochial School Health Bureau**—In most of the large cities in the United States the boards of health provide for medical inspection and follow-up of parochial school children—and public and parochial school children receive the same attention and care. Often in rural and semi-rural communities medical and nursing service is given under the jurisdiction of the state board of health either by direct service or through county health units, in which case all children are served alike. In St. Louis the Board of Education and not the Health Department finances the medical inspection in the public schools, and in order to have this service the 104 Catholic parochial schools in city and county have to finance it themselves.

At first, health work in the parochial schools of St. Louis was conducted by volunteer agencies. St. Louis University provided speakers, the Tuberculosis Association promoted classroom health education, and Catholic women's organizations coöperated and aided in these activities. This arrangement brought results, but there was a lack of unity, and finally a Catholic School Health Bureau was formed with representatives from all these agencies on it. The Catholic women's clubs raised the necessary funds and the Superintendent of the parochial schools and the St. Louis University School of Medicine supervised the health program. This bureau, organized in September, 1927, was the first one of its kind in the United States. It was located at the St. Louis University School of Medicine, which gave it not only a central, convenient point from which to work, but also prestige.

A modern complete school health pro-

gram as we know it today was soon outlined and started. The staff consisted of a director, 4 physicians, 2 public health nurses, and 1 office secretary. A little later a social worker was added through the interest of the Daughters of Isabella, a local Catholic women's organization.

In addition to routine medical inspections and follow-up, health institutes for the teaching sisters were arranged and classes in school hygiene, health education, and care of the problem child were held in St. Louis University for parochial school teachers. For these the sisters and teachers received scholastic credit.

A course of study in health for the parochial schools is in process of being written by a committee of sisters in co-operation with the St. Louis University School of Education and the Catholic School Health Bureau.

The bureau has worked very closely

with the St. Louis Health Department in communicable disease control. It has carried on a continuous research service also, to ascertain the trend in physical defects and learn the relation between schools, neighborhoods, and racial groups. One survey was made to learn what other Catholic communities are doing for handicapped children in parochial schools, and another to study health knowledge versus health habits of children under the supervision of the bureau. A Children's Dental Clinic for parochial school children was established by the St. Louis University School of Dentistry which has been very successful.

The 4 years the St. Louis Catholic School Health Bureau has been functioning have proved the soundness of its organization and value of its work.—Harvey Smith, *Health Work in St. Louis Parochial Schools*, *Pub. Health Nurs.*, XXIV, 4: 210-212 (Apr.), 1932.

# EDUCATION AND PUBLICITY\*

**Two Days of Intensive Study—**Plans are being completed for a Public Health Education Institute to be held immediately preceding the Annual Meeting in Washington in October. Details will be announced next month.

**Health Publicity Awards For 1931-1932—**As announced May 15, public health claimed 4 of the 10 citations for publicity of unusual merit as selected by the Social Work Publicity Council. A committee of 5 met monthly to review the specimens received. The citations for public health material appear below.

The Awards Committee cites for exceptional merit **HEALTH OFFICER'S REPORT, MIDDLETOWN, N. Y.:**

*Because*, prepared with the will-to-be-read, it entices laymen into its net as readers, in addition to public health workers.

*Because* it shows a mastery of mimeographing technic and proves that good taste and effectiveness are not dependent on expensive materials and formality. The illustrations and decorations are deftly done and supply the touch of humor which leavens the whole report. The tailpiece is delightful and the gesture gracious that the able mimeographer has been given the opportunity to sign her work.

*Because* the text is simple, direct and has a sufficiently informal air to hold the interest its appearance has attracted. Public health workers will find the report of activities substantial in spite of its informality. They may miss, however, information on the size of the community, the size of the staff and organization, and the cost of the health program, helpful facts to have in such a report.

The welfare section of the report is headed with a verse,

"To cure myself a great dislike,  
Of little trials life brings,  
I simply call a halt and take  
A different view of things."

While the dramatic illustration shows that this refers to the preschool child's attitude toward spinach, it is exactly what the author has done in approaching the usually considered gloomy task of getting the year's work down on paper. He has taken a different view of annual reports.

The Awards Committee cites for exceptional merit "Two TUBS OF 'CHINY ASTIES'" by Lucretia Penny, Published in *Hygeia*, February, 1932:

*Because* it shows by the short cut of a delightful story the variety of services crammed into the day's work of a county nurse.

*Because* all this knowledge can be gained in about 6 minutes of reading time, and the subtle interplay between nurse and client is told with well sustained implication.

*Because* the young mountain mother, her baby who is the patient, and her stepmother, Miss 'Talithy are flesh and blood. It all sounds real, from the sound of the paling gate swung back into place by a rusty plow point, to the nurse's understanding of the starved lives of tenant farmers.

*Because* the nurse is shown in her frequent rôle of interpreter of two opposing points of view. In this case a family conflict over some "chiny asties" was depriving the delicate 2-year-old girl of milk from her grandfather's cow. Without taking sides and without apparent efforts to referee, she casually plants seeds of the understanding which later brings the factions together.

*Because* even the nurse's victory is most disarmingly recorded, just a swift glimpse of the reunited grown-ups on the stepmother's porch, and the little girl bending demurely over the asters, her hands behind her back, as the nurse drives past the cabin on her way home.

(Lucretia Penny is a pseudonym. The author, who is a frequent contributor to *Hygeia*, gained her knowledge of rural communities

\* Please address questions, samples of printed matter, criticisms of anything which appears herein, etc., to Evart G. Routzahn, 130 E. 22d St., New York, N. Y.

from living in them, and of the people who live and struggle in them from doing family case work in Tennessee and Kentucky. A friend who was a public health nurse gave her the insight into nursing problems.)

The Awards Committee cites for exceptional merit THE 1932 EARLY DIAGNOSIS CAMPAIGN OF THE NATIONAL TUBERCULOSIS ASSOCIATION:

*Because* with an event of importance to live up to, the fiftieth anniversary of Robert Koch's announcement of his discovery of the tubercle bacillus, this year's Early Diagnosis Campaign makes history in our field of getting messages over. First of all, it has made good use of the anniversary day, March 24, to introduce its April campaign by newspaper articles of vivid interest.

The publicity kit contained informative material adaptable to all sorts of original plans that showed good team work between national and local associations. Iowa, for instance, localized the Koch story by featuring the doctor's visit to relatives in a little Iowa town, re-using the photographs which appeared at that time in the *Journal of the State Medical Society*.

*Because*, while the general plan of the campaign is highly praiseworthy for its focusing so intently on the fact that "Tuberculosis Causes Tuberculosis—Every Case Comes from Another," it has an even better point in its favor. The committee feels that the kernel of the campaign's excellence lies in 4 booklets, each written for a special group.

"Closing In On the Old Enemy" is for the health officer; "Where Is the Other Case?" for the physician; "The Adventure of Case Finding" for the public health nurse; and "Why Does It Run in the Family?" for the social worker. Having realized the importance of supplying diversified information to these powerful, highly specialized allies, the association has given them usable material. The booklets, about 10 pages each, are well printed in a conservative but pleasing form which suggests reference material rather than campaign literature.

*Because*, although the leaflet for distribution to the general public, "Tuberculosis Doesn't Just Happen," falls below the 4 professional booklets in quality, other features of the campaign for use on screen, radio, platform, and display approach them in value. The window poster, for instance, with its big and little cog wheels method to convey the inter-relationship between old and new cases of tuberculosis, has the poster prerequisites of good design, simplicity and speed of expression.

The Awards Committee cites for exceptional merit SOLVING THE NURSING PROBLEM IN MILWAUKEE, A Series of Ten Feature Stories in the *Milwaukee Journal*:

*Because* they tell a readable, comprehensive story in true newspaper style. Considering how factual the articles are, attempting to cover thoroughly all divisions of visiting nurse service, they are popular enough to attract casual page combers. Yet in being popular they have not depended at all on the romantic "angel of mercy" halo with which writers often crown the nurse.

*Because* the articles have a well thought out plan. Variety has been captured by telling each story from a different angle—one from the observing eyes of the student nurse who sees for the first time the resourcefulness of "old hands at district nursing" as they improvise household makeshifts in lieu of the complete equipment always at hand in a hospital.

Another article is built on the mystery of "What is in the nurse's black bag?" and on the magic of her skill in packing and repacking its numerous and fragile contents.

*Because* the leads are good, the first being a complete summary of the articles, "A nurse for an hour, a nurse who will skilfully bathe a convalescent, dress a wound, give a refreshing massage, prepare the new baby's formula, or do any other of the numerous things required by a patient in the home who needs expert care at minimum cost is the valuable general service offered by the Visiting Nurse Association."

The second lead, "Eighty-five per cent of the people sick in Milwaukee County are sick at home," stimulates interest in an article on the training of nurses.

*Because* the illustrations and their captions are a real part of the story. Although the captions are written in a decidedly untabloid style, they do make sure that a reader who glances only at the pictures and their titles will get an outline impression of the services of the Visiting Nurse Association.

**War Against Bacteria Dramatized**—Some of the adventure, mystery, and excitement of scientific search among the bacteria is given to that kaleidoscopic group known as the radio audience, in a series of 13 radio plays, "The Drama of Science." The Detroit Department of Health presented the series

under the sponsorship of the Detroit Dairy and Food Council. Written by Rex White, a newspaper man and writer of short plays, they were acted by a professional group, the Detroit Players. A smithy anvil, the howls of mad wolves, the horrors of a primitive war hospital, the sounds on a Viking ship at sea, everything, indeed, except the death rattle of the bacteria placed on "the spot," is included in the "sound" effects accompanying the voices.

If there is some over-sentimentalizing of the material, it may be because the planners measured shrewdly the over-sentimentality of the public mind. And in the same way if, along with the convincing emphasis on courage and sacrifice, there was too much thought of the fame that was to come, it may have been a concession to our success-adoring public.

High points in the dramatization include two scenes in the Louis Pasteur episode, 50 years apart:

*Louis*—I am not afraid, father. (Howl nearer)

*Past.*—Afraid or not—get in. Smith, swing that great door closed.

*Smith*—Aye. I wish you had your musket, Neighbor Pasteur. (Door shuts—howl nearer)

*Past.*—It comes nearer. I swear it's the mad wolf and he's hopping along the highway. He'll run straight along its length and good God protect those who venture in his path. (Howl much nearer)

*Louis*—Look, father, there he comes. See—by Monsieur the Notary's house.

*Smith*—It's so. Here, Jules, give me that hammer. Pasteur, take the scythe just in case he veers toward the smithy door. (Howls)

*Louis*—Oh, father—see. Nicol the peasant. He is filled with wine and he is staggering into the road. Go back, Nicol, go back.

*Smith*—Back, you drunken fool. (Howls—Barks)

*Past.*—Do not look, son, do not look.

*Louis*—I must, father. See, there is the landlord of the inn. He has his pistol.

...

*Louis*—Father—father. What are they going to do?

*Past.*—The smith will press the white hot iron to the wounds. It is the only hope. Perhaps if he is quick enough he can burn the poisons.

...

*Past.*—Aye. It is white hot. Here are the pinchers, Smith. (Clank of iron)

...

*Smith*—Hold him men—tightly. Don't let him move. The arm first. (Hiss of iron—scream of pain)

...

And 50 years later, in Pasteur's laboratory:

*Roux*—He is the most vicious of all, master.

*Past.*—Aye, he looks it. His eyes are all but lost in the crimson curtain of their inflammation.

*Roux*—The poison must be rich in that great throat.

...

*Past.*—Wrap your arms with cloth and wear these gloves.

*Roux*—But you, master.

*Past.*—I cannot have my hands made awkward with gloves. I'll need all my finger skill. Roux—raise the gate. I will catch him by the throat.

*Roux*—Are you sure, master—sure you will not miss? If you do—we all must die.

*Past.*—Hush—timid one. I will not fail.

...

*Roux*—Are you going to swab the throat? I see no instruments.

*Past.*—I have—this.

*Roux*—That? Why that is but a glass tube.

*Past.*—Aye—it will do.

*Roux*—But—but—it has no scraping surface.

*Past.*—No. But it has a hollow stem.

*Roux*—Master, master, not that. You—you are not going to—to—

*Past.*—After I have him out, you and Chamberland will hold him and force his jaws apart—wide. You understand? Then I will place the tube into his throat and—draw up the virus.

*Roux*—Mon Dieu. Master. It is madness. Suppose you miscalculate. One tiny drop of that stuff in your throat—one tiny drop and—

*Past.*—Hush. Up with the gate. I order you. (Gate draws up—dog snarls—hoarse barks—choking noises)

How colorfully the whole series is done is shown by the different atmosphere in this glimpse of Dr. Jenner's smallpox vaccination experiments:



*Jenner*—So hast never had a shilling of thy own, boy?

*Boy*—No, sir. I had tuppence once, doctor. 'Twas fair day and I bought me taffy and great baked potato adrip wi' butter and salt.

*Jenner*—Art a brave boy, James?

*Boy*—I know not. I am not afeered of Farmer Knowle's black Hereford bull which doth chase the other children—and once, you will remember you did set my arm.

*Jenner*—Aye—broke stealing apples, as I also remember. It was because you let never a cry from your lips that I have chosen you today. Your father and mother hath given consent.

*Boy*—Art going to hurt me?

*Jenner*—Nay—no more than the prick of a pin. See—I will take this little knife and make a very small dot in thy arm—no more than you would get sliding down a tree—or dropping into a blackthorn. And I will give thee a shilling for thy very own. To waste in any manner of gauds you wish. Or to fill that small belly of thine with toffee and ginger beer.

...

*Jenner*—Sarah, my girl—hath the water boiled on the hob?

*Maid*—Yes. The kettle has been singing fair loud these 5 minutes.

*Lady Dorothea*—What are you going to do?

*Jenner*—I am going to inoculate the lad with the virus of cowpox—from the hand of Sarah. And 6 weeks from now I will inoculate the same boy with smallpox virus.

*Lady D*—Inoculate? You mean put the poison of the pox into his blood?

*Jenner*—Exactly. I have found by careful study that those who have the cowpox—a minor ailment—never get the smallpox. Why? I do not know. But with this boy I am going to prove my knowledge. . . .

Among the episodes besides the findings of Pasteur are the discovery by Roux, his pupil, of the diphtheria anti-toxin; by Lister, of the safety of surgery; Florence Nightingale fighting not only sepsis in neglected wounds, but the stupidity of the War Department; and the closing down on the yellow fever mosquito by Reed and Carroll.

In each episode there is just enough continuity to connect the drama with our own lives of today, and the last of the series dramatizes a diphtheria experience which had recently occurred in Detroit.—Hilary Campbell.

We plan to follow the above review, from a non-health worker, by comments from several in the field of health. They will discuss the factual material as well as the dramatic setting of these dramatizations.

Copies of the Radiodramas will be supplied upon request to Dr. Henry C. Vaughan, Department of Health, Detroit. Comment should be sent to editor of this department.

## BOOKS AND REPORTS

**A Doctor of the 1870's and 80's—By William Allen Pusey.** Springfield, Ill.: Charles C. Thomas, 1932. Price, \$3.00.

The name of William Allen Pusey as author of any book would attract attention. He has now given us the story of his father's life and practice in a small town in middle Kentucky. He was the old-time country doctor, going over roads in the old fashioned buggy or on horseback in every sort of weather. All persons, regardless of their circumstances, received the same conscientious and kindly attention. Though the surroundings described are widely different, one is constantly reminded of "A Doctor of the Old School."

Dr. Pusey has given a worthy tribute to a loved parent from whom he gained much and to whom he owed much. For the general reader, perhaps the most interesting part of the book is Chapter X, entitled "Appraisal," in which the author discusses the question as to whether those who, like his father, stick to the country in spite of all of its hardships, or the physician of the present day who practises in a city with companionship and all conveniences and assistance constantly at hand get the most out of life. In the following words he sums up the advantages and disadvantages, and concludes in favor of the country doctor:

Things of the sort I have tried to indicate were the compensations for the hardships of the country doctor's life, as Pusey lived it—the satisfactions of a life of useful service, and, as a result of that, economic and spiritual independence and the gratitude and esteem and affection of those he served. A man can hardly hope for more in this world. If he can gain these in an occupation that is in-

teresting and stimulating, that keeps him in the open, that gives him an opportunity for close and abundant association with his family, he has about as much as life offers; and all these Pusey had. The balance in favor of such a life, I should say, is large.

In those who have lived such a life or who have come into contact with such a man, the book will touch a most responsive chord. To the younger practitioners who must have tiled floors, beautiful nurses, and an abundance of dressings, towels and expensive paraphernalia of all sorts even to open a boil, we especially recommend the book as a picture of the type of men who made American medicine.

MAZŮCK P. RAVENEL

**Official and Tentative Methods of Analysis of the Association of Official Agricultural Chemists.** (3d ed.) Washington: Association of Official Agricultural Chemists, 1931. 593 pp. Price, \$5.00.

For the past 10 years public health laboratories have relied on these methods in connection with chemical analyses of foods and drugs. To what extent this work, aside from that necessary for control of dairy products, is properly a function of a public health laboratory, may be seriously questioned, but when such analyses are made it is just as necessary for a public health laboratory to follow recognized "official" methods as it is for the state or government regulatory laboratory. This third edition is very welcome to all concerned.

It would be absurd to attempt a detailed review of a book containing hundreds of methods of analysis. Revisions of old methods and approval of new

ones are made by the association sponsoring these procedures, only after a reasonable amount of publicity. Hence, those chemists most concerned already have been informed of prospective changes. Laboratory workers will await with interest the projected methods involving such subjects as vitamins and bacteriological procedures. The compilers are to be congratulated on the indexing and reference numbers, which will be appreciated by the very large number of chemists who use the book.

JOHN F. NORTON

**Nursing Education: A Survey of Day Nurseries, Nursery Schools, Private Kindergartens in the United States—By John E. Anderson, Ph.D.** *A publication of the White House Conference on Child Health and Protection.* New York: Century, 1931. Price, \$2.00.

This volume is based upon an extensive study of schedules from 1,275 institutions caring for the preschool child in which a total of 49,358 children were enrolled, and upon a study of 2,757 families with over 4,000 children.

The Committee on Education and Training of Infant and Preschool Children had two main projects: (1) A survey of institutions for the education and training of young children, and (2) The study of young children in the home. Only the first of these is considered in this volume.

The report covers the most comprehensive survey of day nurseries, nursery schools, and private kindergartens ever carried out in this country. These institutions are the ones in our country having the largest contact with preschool children.

We have long known a great deal about the infant and the child of school age, but it has been very difficult to secure authentic information regarding the preschool children of whom there are over sixteen million in the United

States. The present survey will help us to evaluate better the functions of the preschool child agencies and their place in modern society.

The book opens with a historical résumé of organized care for young children, and discusses briefly the various types of institutions.

The method of obtaining data is described, and a detailed classification as to type and geographical location given. Typical and selected institutions are discussed. This is followed by a very informative chapter on auspices, support, tuition, and purposes.

Another chapter deals with the number of children cared for in any one institution, sessions, and attendance.

Of special interest to the health officer is the chapter on medical facilities which includes medical inspection, physical and dental examinations, vaccination, immunization, diet, dietitians, etc.

The educational facilities and program receive considerable attention.

Specific recommendations are given, as well as general findings. The appendix contains a copy of the questionnaire used in the study and a geographical list of the contributing institutions.

The same high quality of printing is maintained as in all other publications of the White House Conference.

RICHARD A. BOLT

**Diphtherieepidemien der letzten Jahre, das Heilserum und die Schutzimpfung—By E. Friedberger.** *Aus dem Forschungsinstitut für Hygiene und Immunitätslehre, Berlin-Dahlem.* Berlin and Vienna: Urban and Schwarzenberg, 1931. 50 pp., 56 figs.

Dr. Friedberger, in his monograph on diphtheria epidemicity, has made use of interesting data both statistical and experimental. His work is not so much a criticism of present-day methods for the control and prevention of this dis-

ease as a plea for more careful study of these methods, keeping in mind the fact that all infectious diseases move normally in cycles and that disease and population composition mutually affect each other.

He states that diphtheria is a disease which experiences periods of great dissemination which alternate with periods of almost complete disappearance. It reached its height in Central Europe about the middle of the 80's and then fell with remissions until after the Great War. The decrease, especially since the beginning of the 90's, has been attributed to the introduction of antitoxin without considering the normal decline.

Behring gave to the medical world the idea of active immunization but it was in the United States that this was worked out with great energy and vigor. It appears that since then diphtheria has diminished considerably in America while in Germany it has greatly increased. It is impossible, however, to conclude that this decrease was due to the measure of control alone. Since 1924, both in the old and new worlds, the idea of diphtheria prophylaxis and therapeusis has become so firmly established that the following relationships seem apparent: the United States with much protective immunization has little diphtheria while Europe with little protective immunization has a great deal.

If these associations are based on cause and effect, immunization should be practised in Europe and diphtheria should then decrease as in America. Differences in economic conditions in the two hemispheres during the last 20 years must be considered before this assumption may be made. Gottstein pointed out the fact that antitoxin was first employed during the descending phase of a natural wave of diphtheria incidence. He was able also to explain fluctuations on the basis of increased natural immunization because of latent infection of alternate generations. He

asserted that the real test of diphtheria prophylaxis and therapy would come when the infection again began to ascend naturally.

Morbidity and mortality have increased greatly in Germany but the fatality rate has decreased. The increase of diphtheria is not as yet in the nature of a general epidemic but is localized in certain focuses, Berlin, Rhineland-Westphalia, Koenigsberg, Breslau, etc. The focuses are well scattered and the mortality is highest in large cities. In Leipzig (1910) and in Hamburg (1911) similar focuses occurred. The failure of serum treatment at that time was said to have been because of the low unit value, insufficient doses, and delayed administration. The same failure is being observed at the present time when these explanations do not hold.

Friedberger closes with the statement that because of the great concentration on the theoretical aspects of serum therapy there has been an unwarranted application of laboratory results to human experience. By the collection of epidemiological data concerning diphtheria incidence, therapy, and protective immunization, new avenues of approach to control measures against diphtheria should be made possible.

E. L. LUCIA

#### Gynecology and Urology for Nurses

—By Dr. Samuel S. Rosenfeld. New York: Wood, 1931. 230 pp. Price, \$2.00.

At the National League of Nursing Education in Atlanta, 1931, Dr. May Ayres Burgess made a plea for simpler nursing textbooks. This seems to be one of the strong points in Dr. S. S. Rosenfeld's new book.

The first three chapters cover briefly and concisely the anatomy, physiology and pathological conditions of the female genital tract. These serve as a good background for the procedures,

medical and surgical, which are covered next.

The illustrations are clear-cut and not so numerous as to be confusing.

Operative procedures described are the ones most commonly met, and the student is not bewildered by a multitude of variations.

The chapter on Urology might be considered a bit too brief. The pathological conditions are clearly described, but the operative measures will need to be supplemented by well planned lectures.

On the whole, the textbook should prove valuable for use during the course of gynecology and urology, and also as a worthwhile addition to the reference library.

JESSIE L. GROVES

*Essays on Marriage—By Frederick M. Harris. New York: Association Press, 1931. 208 pp. Price, \$2.00.*

The late Frederick Harris, of the national staff of the Young Men's Christian Association, left unfinished manuscripts which the editor, Professor Harrison S. Elliott, has arranged in ten very interesting and thought provoking essays regarding present-day problems of marriage.

The chapters deal with the present status and attitudes, marriage customs, marriage a partnership, conjugal affection and sexual desire, results of ignorance and silence, choice of a mate, and limitation of families. The book will be useful to discriminating advisers and counsellors who deal with personal problems in the matrimonial field and to critical readers who are advanced in their studies in family sociology; but for the rank and file of general readers who need some guidance in preparation for marriage, these essays will suggest more problems than they will solve.

Note that the book is recommended to "discriminating" counsellors and "critical" students. This is so because the essays are, in spots, uncritical

and unscientific, certain authors quoted are not worth the space, some advice given is highly debatable, and many good points get lost in a wilderness of words. In short, the book as a whole is not for the beginner in matrimonial literature, but interesting and stimulating for one who already knows enough to pick and choose the paragraphs where the author is on solid ground.

M. A. BIGELOW

*The Essentials of Swimming Pool Sanitation—By C. A. Scott, P.B.E. Chicago: Published by Author, 1931. 126 pp. Price, \$1.00.*

Swimming pool managers, public health officials, and others having to do with the operation of swimming pools have long felt the need of a book to which they could turn for information when they were in doubt as to some question of sanitary practice. This need the author has attempted to supply by telling in his own language some of the facts and principles which have been hidden in the various reports of the Joint Committee on Bathing Places of the Conference of State Sanitary Engineers and the Public Health Engineering Section of the American Public Health Association.

After a short homily on the passing of the old swimming hole and its replacement by the modern swimming pool with its complicated equipment for purification and disinfection, the author proceeds with discussions of the bacteriology of swimming pool water and of the methods for making bacteriological examinations and their significance. The bacteriological procedures recommended generally follow the *Standard Methods for Water Analysis*. There are, however, some discrepancies, as, for example, in the use of dextrose broth for making fermentation tests which was discarded as standard practice some 20 years ago. The erroneous statement that the standard limits for

numbers of bacteria in pool waters are the same for counts made on agar plates incubated at room temperature and at body temperature can probably be attributed to careless proof reading.

The real meat of the book is contained in 3 chapters: Removal of Objectionable Matter, The Filter and Its Operation, and Sterilizing the Water, in which the different types of apparatus for cleaning the pool, and the equipment for keeping the water clean and safe are described and their operation is outlined.

Suggestions are given for the care of the floor and walls of natatoriums. A schedule is outlined covering the operator's daily routine for cleaning the pool, inspection and maintenance of the filter and sterilizing equipment, and for making the necessary chemical tests of the water, for which the methods are described fully. A section on trouble shooting should be very helpful to the operator whose filtration system fails for some unknown reason to function properly. The directions for first aid treatment for chlorine exposure are also useful although the probability that they may be needed is rather remote.

In his discussion of methods for sterilizing the water the author takes issue with the Joint Committee on Bathing Places for their failure to approve other methods than chlorination, and presents in some detail the advantages claimed by manufacturers of ultraviolet ray and ozone equipment.

The final chapter treats of the methods for submerged lighting of pools, a subject which is just beginning to come into prominence. Notes at the end of the book contain miscellaneous information on the requirements for pool marking for swimming meets, official dimensions and height of spring boards, etc., which will help the owners in making the pool useful to the public.

Unfortunately there is a lack of coordination in the arrangement of the subject matter, in numerous cases im-

portant topics being introduced into the discussion of unrelated subjects. In the absence of either a table of contents or an index this makes difficult the use of this book as a handbook or work of reference, which is its stated purpose. Nevertheless it fills a gap in the literature of public sanitation which has long been conspicuous and should therefore find a ready welcome by public health officials as well as those who own and operate swimming pools.

STEPHEN DEM. GAGE

**Cancer and Race: A Study of the Incidence of Cancer Among Jews**  
—By Maurice Sorsby. New York: Wood, 1931. 120 pp. Price, \$3.00.

Dr. Sorsby has produced one of the most interesting books on cancer which have appeared for a long time. In spite of the fact that its scope is limited to a statistical study of the incidence of cancer among Jews as compared with the incidence among others living in the same environment, and to a consideration of the factors which may account for the differences found, the volume is one which no serious student of the prevalence of cancer can afford to be without. It is the outcome of a paper which the author read at the international conference on cancer in London, 1928, in which the comparative freedom of Jewish women from cancer of the uterus was attributed to their habits of sexual hygiene.

In this book the author sets out to see, first, whether there is any material difference between the mortality from cancer among Jews and others. He chooses for his data a number of cities of large size which offer the most reliable statistics obtainable for such an inquiry—London, Amsterdam, Vienna, Budapest, Warsaw, Lodze, and Leningrad. The buccal cavity, penis, breast, uterus, ovaries, and gastrointestinal tract are the sites considered.

Contrary to the view once held, it is

found that the total incidence of cancer among Jews follows closely its incidence among other citizens. There is a closer parallel between the Jews and non-Jews of any city than between the Jews of different cities. The author concludes that there is no evidence of a Jewish immunity.

Some organs are more, some less, affected in Jews as compared with non-Jews, and in certain respects these differences are remarkable. The reasons are not clear.

Fatal cases are comparatively rare among Jews in cancer of the buccal cavity, penis, and uterus. The rarity of syphilis among Jews seems to account for the first, circumcision for the second, and certain practices of a hygienic nature required of Jewish women by their religion for the third. Cancer of the breast was found to be neither more nor less prevalent among Jewish women than among others. Ovarian cancer occurred more often in Jewesses, but the number of instances recorded was not large enough to warrant any interpretation. Cancer of the gastrointestinal tract and especially of the intestines was decidedly more frequent among Jews. The author finds it difficult to account for the excess of gastrointestinal cancer among Jews, but offers several possible explanations.

It is interesting to observe that Dr. Sorsby does not seem to consider the possibility that a racial factor may exist and manifest itself in a characteristic organ susceptibility or resistance, and yet this is possible. It is entirely reasonable to suppose that Jewesses inherit an unusual resistance toward cancer of the uterus and an unusual susceptibility to gastrointestinal cancer.

In view of the large amount of labor which he has put upon his excellent research, it is curious to note that the author seems to see only one possibility in the way of a racial peculiarity: apparently he thinks that if Jews are more

or less susceptible to cancer than non-Jews, this fact should make itself apparent in all the organs of the body.

It should be remarked in passing that Dr. Sorsby, like practically every other investigator in his field, assumes that, in cancer, "incidence" and "mortality" are interchangeable terms.

These criticisms by no means detract from the value of the book. Rather, they point to an extension of this particular field of inquiry. No kind of cancer research is so commonly attempted, and, as ordinarily conducted, so incompetently handled, as statistical and epidemiological investigation. A prospect of genuine service lies ahead of really qualified workers in this field.

GEORGE A. SOPER

*Tumbling Illustrated—By L. L. McCloy. Illustrated by D. N. Anderson. New York: Barnes, 1932. 212 pp. Price, \$3.00.*

This profusely illustrated book on tumbling, containing in 212 pages some 666 different exercises, is designed for the use of physical education teachers who may wish to give instructions in tumbling, and also for the use of individuals who wish to find new exercises or to perfect themselves in this phase of physical activity.

Tumbling has for many people a life-long interest, it "is not a temporary fancy, but a life-long interest from early childhood to old age. Evidence of this is seen on the bathing beach, the lawns or in the gymnasiums, where all ages will attempt such stunts as the cartwheel or standing on their heads and hands." These exercises are grouped under certain major headings: individual; couples' exercises; one performer and thrower, etc.; and are graded as to difficulty. The exercises are named and very instructively illustrated by line drawings which are followed by hints as to procedure in an effort to render the exercise easier.

For those teaching or interested in tumbling this would be a very desirable work, and probably is, at present, the most complete of the descriptive texts in this field. CHARLES H. KEENE

**Handbook of Tropical Fevers**—By N. P. Newell, M.D., and W. H. Kauntze, M.D., New York: Wood, 1932. 285 pp. Price, \$6.00.

The authors have given us an unusually interesting book on the subject of tropical fevers, based on an experience which commands respect and attention. In addition to this, they have consulted the best authorities on tropical diseases throughout the world. One naturally feels some hesitation in reviewing such a book, as many of the diseases are practically unknown in the temperate zones or occur so rarely that few people have had any experience with them on which to base opinions.

The authors treat blackwater fever as a special disease, but express their belief that at least 2 and perhaps 3 diseases have been confused under this general name. While stating that the etiology of the disease is uncertain, they lean to the opinion that subtertian (*estivo-autumnal*) malarial infection is the primary factor. Quinine is ruled out on the very just ground that blackwater fever was recognized by Hippocrates; long before quinine came into use. However, they admit that in some cases quinine may produce hemoglobinuria, and give a case which came on after administration of 5 grains of the drug, which resulted fatally.

The most serious criticism of the book is that in spite of the long list of authors quoted, there is a notable absence of Americans. In this country we are inclined to think that Americans, and especially the Army Commission, had much to do with the clearing of the etiology of breakbone fever. In the 18 pages devoted to yellow fever, no mention is made of the name of Carlos

Finlay—which he surely deserves. In this connection, we are glad to note, however, that Noguchi's error in believing that the *Leptospira icteroides* was the cause of the disease is corrected. The name of no American is mentioned in the chapter on bubonic plague, though we are accustomed here to believe that very important work was done, especially in connection with the pneumonic type of the disease, by Teague and others. Altogether, the book is up-to-date, interestingly written, and correct as to facts. The printing and make-up are excellent.

MAZÛCK P. RAVENEL

**Communicable Diseases for Nurses**—By A. G. Bower, M.D., and E. B. Pilant, R.N. (2d ed.) Philadelphia: Saunders, 1932. 358 pp. Price, \$3.00.

This book shows the practicality of having a physician and a nurse collaborate in writing a textbook for nurses. The first part, which deals with definitions of terms in communicable diseases, medical aseptic technic, and care of communicable disease in the home, probably could not be improved upon for clarity and completeness.

The different communicable diseases are then dealt with very effectively and completely under the headings of definition, analogy, mode of infection and conveyance, immunity, symptoms, complications and sequelae, prognosis, treatment, and nursing care.

In the chapter on rabies under diagnosis, however, the authors state that if a dog is obviously rabid it should be immediately killed and the diagnosis confirmed by either finding the Negri bodies in its brain or by inoculating some of this brain substance into other animals. Why take a second animal when the one under observation will serve as a laboratory animal? An animal living through the ordeal will prove himself non-rabid. If a person is bitten



on the face start Pasteur treatment immediately and wait for diagnosis. If it proves negative stop treatment; no harm has been done.

It is disappointing to find Vincent's angina and ringworm so briefly mentioned, each in a paragraph describing another disease. Where do scabies, athletic foot, and pediculosis come in? All these diseases except athletic foot are on the list in "Standard Regulations for the Control of Communicable Diseases," published by the American Public Health Association, and they are serious problems to nurses in the public health nursing field who can never find information enough about them.

The book is excellent. Nurses, mothers and perhaps the physicians need it. Its only sins are those of omission. EVA F. MACDOUGALL

**Mental Healers—Franz Anton Mesmer, Mary Baker Eddy and Sigmund Freud—By Stefan Zweig.** *New York: Viking Press, 1932. 363 pp. Price, \$3.50.*

The author, who says that he is not a mesmerist, a Christian Scientist or a psychoanalyst, and is not moved to write about these subjects through his fanatical belief in the efficacy of any of them, nor through gratitude, has given us an exceedingly interesting study of 3 outstanding characters who he believes while "going their several ways, have worked upon the same principle and brought healing to hundreds of thousands—Mesmer, by means of suggestion,

strengthening the will-to-health; Mary Baker Eddy, by the anesthetic ecstasy of faith, conjuring pain and sickness out of the world; Freud, by rendering the patient aware of the conflict that burdens the unconscious and thus enabling him to escape its spell." He evidently believes strongly in the influence of the mind on the body but in his analyses seems to leave out of consideration the fact that many of the so-called healed people were not sick physically to begin with.

The life histories of the 3 persons selected follow the usual lines and are accurate according to the testimony of authorities. In treating of Mrs. Eddy, he goes more into her love of money and eagerness to collect it than many others do. We confess it rather jars us to have the name of a great man like Freud considered along with the other two, and especially Mrs. Eddy. Mesmer and Freud have taught us much which is worthwhile. Mrs. Eddy has certainly revealed a twist of the human mind which is astonishing and does not tend to strengthen our faith in the average of the intellectual level.

Though we have not seen the original, we judge that the translation is excellent. Certainly the English is good and has been put into a most interesting and readable form. The book can be read by any educated person with pleasure as well as profit. Specialists doubtless can detect flaws not evident to the average reader.

MAZŮCK P. RAVENEL

# A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Complicating the Diphtheria Picture**—"The conclusions drawn from a survey of diphtheria in Leeds in recent years, . . . are as follows: (1) There are two forms of diphtheria bacillus. (2) The *B. diphtheria gravis* is associated with severe toxic cases. (3) The *B. diphtheria mitis* is associated with milder cases of the disease. . . . (4) The increased virulence of diphtheria in Leeds is due to an increased prevalence of *B. diphtheria gravis*."

ANDERSON, J. S. The Trend of Diphtheria. Pub. Health, 45, 7: 198 (Apr.), 1932.

**New York State Health Survey**—This summary of the extensive findings and recommendations of the State Health Commission, now published in book form, gives an excellent bird's-eye view of what good state health administration should be.

ANON. State Health Commission Completes Its Work. Health News (New York State Dept. of Health), 9, 14: 53 (Apr. 4), 1932.

**Smallpox Trends**—Statistical evidence in support of the statement that: "The efficacy of smallpox vaccination . . . is shown by the progressive decline . . . in central and eastern Europe where vaccination has become general, while the disease . . . spreads in England and the United States where vaccination is not in fact universally compulsory."

ANON. Trend of Smallpox Incidence in Civilized Countries. Pub. Health Rep., 47, 15: 837 (Apr. 8), 1932.

**Typhoid Fever in 1931**—The total typhoid rate for the large cities (over 100,000 population) is almost the same as for the two preceding years. Twelve of the 93 cities had no deaths, the largest number so far recorded.

ANON. Typhoid in the Large Cities of the

United States in 1931. J. A. M. A., 98, 18: 1550 (Apr. 30), 1932.

**All That's Wrong with Public Health**—The author at his best—and worst. If his indictment of health administration is half true, it is a serious charge indeed. The trouble is, it isn't. The particulars which he advances may be in part the truth, but the general impression left by the story is not. The paper, however, will delight *Mercury* readers, and infuriate a few health workers. The author completes his picture by labelling health officials "communistic radicals" than which nothing could be more completely damning.

CLENDENING, L. Hygeia vs. Aesculapius. Am. Mercury, 26, 101: 28 (May), 1932.

**Health Examinations**—The history of the present ambitious health examination program in New York City holds much of interest to all who are concerned with health promotion.

GALDSTON, I. The Health Examination Idea. Millbank Quart. Bull., 10, 2: 81 (Apr.), 1932.

**Virulence of BCG**—A British research worker inoculated BCG into guinea pigs, monkeys, rabbits and goats, producing lesions which tended to heal, the bacilli within them dying out. His conclusions are: "The results of my investigations support the contention of Calmette that BCG may be used as a vaccine without risk of causing progressive lesions."

GRIFFITH, A. S. A Study of BCG Strain of Tubercle Bacillus. Lancet, 222, 4: 303 (Feb. 6), 1932.

**Undulant Fever**—An excellent summary of the whole subject of undulant fever covering etiology, symptoms, diag-

nosis, treatment and epidemiology for those who have not kept abreast the voluminous literature on this topic.

HASSELLTINE, H. E. Undulant Fever. *Pub. Health Nurs.*, 24, 4: 181 (Apr.), 1932.

**Possibilities of Scurvy**—Although scurvy is seldom seen, due to the general dietary improvement, it is quite possible, if not probable, concludes the author, that economic conditions here and abroad may entail a return of scurvy both in infants and older persons.

HESS, A. F. Recent Advances in Knowledge of Scurvy and the Anti-Scorbutic Vitamin. *J. A. M. A.*, 98, 17: 1428 (Apr. 23), 1932.

**Dried Lactic Acid Milk**—The clinical results of a comparative feeding study indicate "that dried lactic acid milks can be used under the same conditions as cultured sweet milk and cow's milk plus U. S. P. lactic acid."

HESS, J. H., *et al.* Dried Lactic Acid Milks as a Long Continued Diet for Infants. *J. A. M. A.*, 98, 15: 1250 (Apr. 9), 1932.

**Koch's Historic Demonstration**—The dramatic story of Koch's demonstration of the tubercle bacillus precedes a translation of his original paper, a truly historic document. Every health library should have a reprint.

KRAUSE, A. K. Introduction to the Actiology of Tuberculosis. *Am. Rev. Tuberc.*, 25, 3: 285 (Mar.), 1932.

**The Improvement of Industrial Medicine**—The faults as well as the possibilities in industrial medicine are set forth in frank detail. A plea for better industrial hygiene is made.

MCCOY, C. P. The Economics of Industrial Medicine. *J. A. M. A.*, 98, 15: 1238 (Apr. 9), 1932.

**Diet and Children's Teeth**—A group of children were given a cereal-free diet, rich in vitamin D and calcium.

Active caries was almost eliminated, the results being perceptibly better than when the vitamin and mineral were added to a diet containing cereal.

MELLANBY, M., and PATTISON, C. L. Influence of a Cereal-Free Diet Rich in Vitamin D and Calcium on Dental Caries in Children. *Brit. M. J.*, 3715: 507 (Mar. 19), 1932.

**Vitamin-Less Cod Liver Oil Products**—After reading this report, our faith in cod liver oil substitutes will suffer. Of 17 brands of tablets tested, only 2 were found to contain therapeutic quantities of vitamins A and D. Unfortunately, these two are not named. Of 7 brands of capsules, 2 only filled the bill. Of 28 "hydro-alcoholic" preparations, none had significant quantities, though there was plenty of alcohol! Of 7 concentrates, 3 met the test.

NELSON, E. M., and WALKER, R. Vitamin Content of Medicinal Cod Liver Oils and Related Products. *J. A. M. A.*, 98, 15: 1263 (Apr. 9), 1932.

**Opportunities in Public Health**—Not only are the opportunities open to the practising physician in the fields of preventive medicine and health promotion within his own private practice ably presented, but as well the opportunities for the physician in health administration are given consideration.

OSBORN, S. H. Problems and Opportunities in Public Health and the Relation of Practising Physicians Thereto. *New Eng. J. Med.*, 206, 17: 877 (Apr. 28), 1932.

**Cadmium Poisoning**—This metal, which we supposed existed only in chemistry books, has a wide use in rust proofing processes. Unguarded, its use may create a serious industrial hazard.

PRODAN, L. Cadmium Poisoning: The History of Cadmium Poisoning and Uses of Cadmium. *J. Indust. Hyg.*, 14, 4: 132 (Apr.), 1932.

**How Much Sickness Do We Prevent?**—"It is impossible to escape the

conclusion to which the statistics drive us, that public health and the practice of medicine have as yet barely touched the task of preventing the conditions which manifest themselves in actual illness and all that illness implies." So concludes this stimulating presentation of some of the findings of the Hagerstown studies.

SYDENSTRICKER, E. Statistics of Morbidity.

Millbank Quart. Bull., 10, 2: 101 (Apr.), 1932.

Respiratory Flora of Eskimos—  
Cultural studies of the throats of Eskimos living in remote Arctic areas indicate that the flora is, in general, similar to that of persons living here.

WELLS, J. R., and HEINBECKER, P. The Respiratory Flora of Eskimos in Remote Northern Regions. J. Infect. Dis., 50, 4: 281 (Apr.), 1932.

## BOOKS RECEIVED

- GROWTH AND DEVELOPMENT OF THE CHILD. Part III. Nutrition. Publication of the White House Conference. New York: Century, 1932. 532 pp. Price, \$4.00.
- MAN AND MEDICINE. An Introduction to Medical Knowledge. By Dr. Henry E. Sigerist. New York: Norton, 1932. 340 pp. Price, \$4.00.
- THE FINE ART OF LIVING. By Daniel S. Sager. Philadelphia: Dorrance, 1932. 215 pp. Price, \$2.00.
- OBSTETRIC EDUCATION. Publication of the White House Conference. New York: Century, 1932. 302 pp. Price, \$3.00.
- NUTRITION SERVICE IN THE FIELD. Child Health Centers: A Survey. Publication of the White House Conference. New York: Century, 1932. 196 pp. Price, \$2.00.
- MANUAL OF PUBLIC HEALTH NURSING. 2d ed. National Organization for Public Health Nursing. New York: Macmillan, 1932. 253 pp. Price, \$1.50.
- DIET AND WEIGHT CONTROL. By Shirley W. Wynne. New York: Liveright, 1932. 223 pp. Price, \$1.00.
- NORMAL YOUTH AND ITS EVERYDAY PROBLEMS. By Douglas A. Thom. New York: Appleton, 1932. 368 pp. Price, \$2.50.
- THE YOUNGEST OF THE FAMILY. By Joseph Garland. Cambridge: Harvard University Press, 1932. 196 pp. Price, \$2.00.
- MICROSCOPIC SLIDE PRECIPITATION TESTS FOR THE DIAGNOSIS AND EXCLUSION OF SYPHILIS. By B. S. Kline. Baltimore: Williams & Wilkins, 1932. 99 pp. Price, \$2.50.
- HUMAN STERILIZATION. By J. H. Landman. New York: Macmillan, 1932. 341 pp. Price, \$4.00.
- NEW JERSEY'S AGRICULTURAL EXPERIMENT STATION, 1880-1930. By Carl Raymond Woodward and Ingrid Nelson Waller. New Brunswick: New Jersey Agricultural Experiment Station, 1932. 645 pp. Price, \$2.50.
- THE BUSINESS MAN AND HIS HEALTH. By Jesse Feiring Williams. New York: McGraw-Hill. 175 pp. Price, \$2.00.
- REPORT ON THE LEGAL USE OF NARCOTICS IN DETROIT FOR THE PERIOD JULY 1, 1925 TO JUNE 30, 1926 TO THE COMMITTEE ON DRUG ADDICTIONS. By C. E. Terry. New York: Bureau of Social Hygiene, Inc., 1931. 27 pp.
- OXFORD MEDICAL ADVISER FOR THE HOME. By John D. Comrie, M.D. New York: Oxford, 1931. 391 pp. Price, \$2.25.
- A SYSTEM OF BACTERIOLOGY IN RELATION TO MEDICINE. Vol. V. Various Authors. His Majesty's Stationery Office, 1930. 505 pp. Price, \$6.00.
- A SYSTEM OF BACTERIOLOGY IN RELATION TO MEDICINE. Vol. VIII. Various Authors. His Majesty's Stationery Office, 1931. 390 pp. Price, \$6.00.
- MEDICAL ENTOMOLOGY. A Survey of Insects and Allied Forms which Affect the Health of Man and Animals. By William A. Riley and Oskar A. Johannsen. New York: McGraw-Hill, 1932. 476 pp. Price, \$4.50.
- SOCIAL WORK ADMINISTRATION. By Elwood Street. New York: Harper, 1931. 467 pp. Price, \$3.00.
- THE LAME, THE HALT AND THE BLIND. By Howard W. Haggard. New York: Harper, 1932. 420 pp. Price, \$4.00.
- MATERNITY HANDBOOK. By The Maternity Center Association. New York: Putnam, 1932. 178 pp. Price, \$1.00.

## NEWS FROM THE FIELD

### ADDITIONAL SUMMER SCHOOL COURSES

**I**NFORMATION from the two following colleges came too late for the May issue. We therefore mention them for those interested.

*University of California*, Los Angeles, Calif.

June 27–August 6

Elementary Epidemiology  
Elementary Public Health  
School Hygiene  
Procedures in Health Education  
Principles and Practice of Public Health Nursing  
Administration of Schools of Nursing  
Supervision in Schools of Nursing

*Washington University*, St. Louis, Mo.

June 17–July 29

Principles of Public Health Nursing  
Family Health

### PENNSYLVANIA PUBLIC HEALTH ASSOCIATION

**T**HE Pennsylvania Public Health Association had its annual meeting on May 26 and 27, in Pittsburgh. Many important papers were presented, including one on "The Advantages of a Municipal Health Center" by Charles B. Crittenden, M.D., Director of the Angeline Elizabeth Kirby Memorial Health Center, Wilkes-Barre; "Health Conservation in Middle Age" by Victor G. Heiser, M.D., of The Rockefeller Foundation, New York; and an address on "Adventures in Health Education" and the "Shanghai Cholera Parade" moving pictures by W. W. Peter, M.D., Director of the Health Bureau of Cleanliness Institute, New York.

### SOUTH CAROLINA PUBLIC HEALTH ASSOCIATION

**T**HE annual meeting of the South Carolina Public Health Association

was held April 19 at Columbia, S. C. The officers elected were: John B. Setzler, M.D., Columbia, S. C., President; Laura Blackburn, R.N., Columbia, S. C., Vice-President; and Lois Orr Preach, R.N., Anderson, S. C., Secretary-Treasurer.

### PENNSYLVANIA SEWAGE WORKS ASSOCIATION

**T**HE Pennsylvania Sewage Works Association will hold its Sixth Annual Conference at State College, Pa., on June 22–24. It will follow the Conference of the Pennsylvania Water Works Operators' Association, to be held on June 20–22. Among the subjects to be discussed are: the new Allentown sewage treatment plant—shown in motion pictures—and that at Erie; "Sludge Digestion Experiences at Baltimore," "Explosion Hazards of Gas from Sewage Sludge Digestion Tanks," and "Insect Control."

### ANTI-MOSQUITO MEETING

**T**HE Tenth Annual Meeting of the Florida Anti-Mosquito Association was held at Clearwater, Fla., March 14 and 15. The U. S. Public Health Service and the A. P. H. A. were represented by Dr. T. H. D. Griffiths, and the U. S. Department of Agriculture had as its representatives Entomologists McNeel and Hull. The Georgia State Board of Health sent its Chief Engineer, L. M. Clarkson.

The program was interesting and varied, covering the problems of mosquito, malaria and sand-fly control. Progress reports were presented by the three Mosquito Control Districts of Florida and by the Taylor County Health Unit of the state.

The meeting was attended by repre-

sentatives of the Florida State Board of Health and others interested.

#### CHILD LABOR CONFERENCE

THE National Child Labor Committee held its 27th Annual Conference in Philadelphia, Pa., on May 17. The general subject was Child Labor and the Schools in a Depression Period.

#### FREE HOSPITAL SERVICE

AT the annual distribution luncheon of the United Hospital Fund, in New York on May 9, a total of \$575,000 was presented to the presidents of the 55 associated hospitals, representing the share of each in the proceeds of the public collection for the provision of free hospital service, apportioned among them on the basis of free service rendered during the preceding year. The reports for 1931 show that the 55 hospitals gave a total of 1,752,998 days of free care in their wards; of this total, 1,043,000 days were credited to the 29 general hospitals and 709,998 to the 26 special hospitals. The free visits to the Out-Patient Departments of these hospitals increased 17 per cent over those of 1930.

#### TWINS

IN every 50 live births in Maryland, in 1931, there was an average of one set of twins. The total number of live births recorded was 28,705. This number includes 298 sets of twins—596 children—or 2 per cent of the total. The ratio was the same for Baltimore City, and the counties, for both white and colored races. The report of the U. S. Bureau of the Census, for births for 1928, the latest period for which complete records are available, gives a total of 2,233,149 births in the U. S. Birth Registration Area, comprising 94.4 per cent of the total population. There were 23,863 sets of twins—47,726 children, or 2 per cent of the total. These figures, like those for Maryland,

do not include the plural births in which one or both children died. These figures indicate that one set of living twins was born to each one hundred mothers.

#### EYE COURSES

THE National Society for the Prevention of Blindness plans to sponsor, next fall, two courses for medical social service workers in eye hospitals and clinics. The society will coöperate with Washington University, St. Louis, and the Massachusetts Eye and Ear Infirmary, Boston, in giving these courses which will probably extend through a period of 16 weeks. A few scholarships may be available later. Those interested should communicate with Eleanor P. Brown, Secretary of the National Society for the Prevention of Blindness, 450 Seventh Avenue, New York, N. Y.

#### PERSONALS

C. HAMPSON JONES, M.D., Health Commissioner of the City of Baltimore, died April 11 in his 74th year. Dr. Jones was associated with the Baltimore Health Department since 1896, with the exception of the years 1915 to 1919. He has served as Commissioner of Health for 14 years. He was a member of the A. P. H. A. since 1915 and was made a Charter Fellow in 1922. He served the Health Officers Section as Vice-Chairman, 1926–1927, and as Chairman, 1927–1928, and was a member of the Governing Council of the Association, 1923–1924.

HARRY E. RANSOM, M.D., was appointed City Health Commissioner of Des Moines, Ia., to succeed Harley L. Sayler, M.D. Doctor Ransom is very well qualified to serve as chief of the health department by virtue of many years of service as an assistant to former commissioners.

## CONFERENCES

- June 2-3, State and Provincial Health Authorities of North America, Washington, D. C.
- June 2-3, State and Territorial Health Officers Conference, Washington, D. C.
- June 6-9, National Tuberculosis Association, Colorado Springs, Colo.
- June 9-11, Third Annual Meeting, Western Branch, American Public Health Association, Denver, Colo.
- June 20-22, Pennsylvania Water Works Operators' Association, State College, Pa.
- June 22-24, Sixth Annual Conference of the Pennsylvania Sewage Works Association, State College, Pa.
- June 28-30, Conference of Health Officers and Public Health Nurses in New York State, Saratoga Springs, N. Y.
- July 9-16, Royal Sanitary Institute, Brighton, England.
- July 21-29, 100th Anniversary Meeting, British Medical Association, London.
- July 25-30, Regional Conference of the World Federation of Education Associations, Honolulu, Hawaii.
- September 6-9, International Union Against Tuberculosis, The Hague.
- September 12-19, American Hospital Association, Detroit, Mich.
- October, 1932, Meeting of the Health Committee of the League of Nations, Geneva.
- October 3-7, Twenty-first Annual Safety Congress and Exposition, Washington, D. C.
- October 24-27, 61st Annual Meeting, American Public Health Association, Washington, D. C.
- November 14-18, Tenth Annual Short School, Texas Public Health Association, Dallas, Tex.

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FIVE OF THE PAPERS WHICH APPEARED IN THE APRIL ISSUE

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# American Journal of Public Health and THE NATION'S HEALTH

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Number 7

## Interpretation of Laboratory Findings in Rural Spring Water Supplies\*

EDMUND K. KLINE, DR.P.H., F.A.P.H.A. AND NELSON M. FULLER

*Director of Laboratories; and Sanitary Engineer; Cattaraugus County  
Department of Health, Olean, N. Y.*

ATTEMPTS to reconcile the results of sanitary surveys and of laboratory examinations in rural water supplies of Cattaraugus County indicated that in supplies from springs, certain periods of the year when laboratory findings became distinctly unfavorable were coincident with the appearance of small numbers of salamanders in the springs. Testing out the assumption that these were related phenomena it seemed desirable to make a study of the salamanders found and to ascertain experimentally whether it was reasonable to suppose that their presence could influence the quality of a water as measured by laboratory tests. This paper is a report of certain phases of such work and is presented in the hope that it will stimulate interest in the problem, and suggest to other workers the possibility of advances in water control technic through the elimination of salamanders from rural spring water supplies.

Salamanders are small amphibians popularly known as salamanders, chameleons, lizards, ground puppies, newts, efts, mud puppies, or hellbenders. Eleven species have been found in Cattaraugus County during our investigations,<sup>1</sup> and 2 additional<sup>2</sup> are reported by Bishop.<sup>3</sup> Of these only 2 have been found in large numbers in springs, *Gyrinophilus porphyriticus*—the purple salamander, and *Desmognathus fuscus fuscus*—the dusky salamander, although 3 other species, *Desmognathus fuscus ochrophaeus*—the mountain salamander, *Eurycea longicaudata*, and *Eurycea bislineata* are occasionally

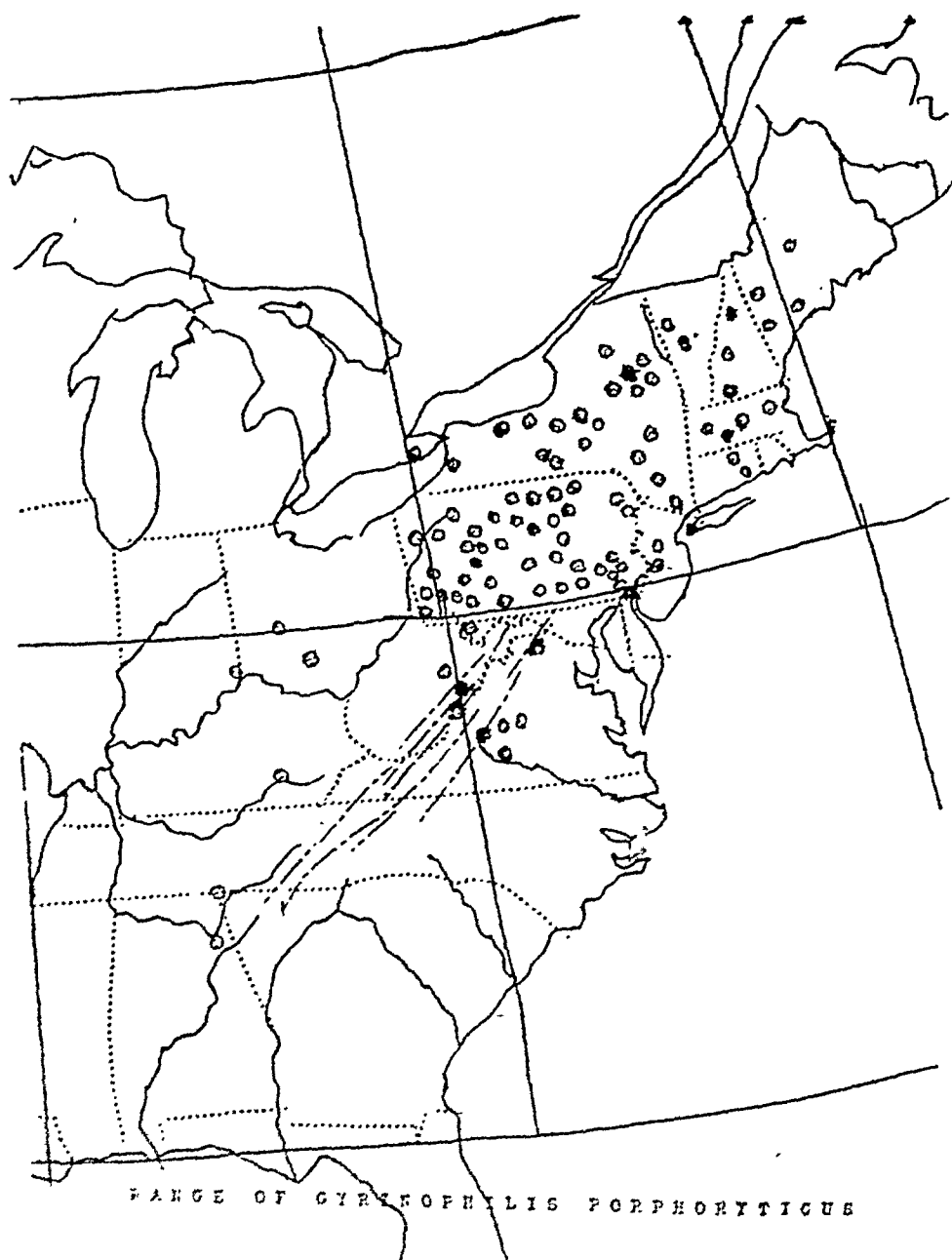
\* Read before the Laboratory Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 14, 1931.



found in springs. The other species are in the main terrestrial or deep water dwellers.

All 5 species are produced from eggs fertilized in the female cloacae by spermatophores either transferred directly from the male or deposited by the male and later drawn into the cloacae. The eggs, usually about 20, hatch about 8 weeks after being laid, producing larval forms provided with external gills and therefore necessarily aquatic. After 9 months to over 2 years, varying with the species,

FIGURE I



*Reprinted from The Salamanders of the Family Plethodontidae, by Emmett Reid Dunn*

the larvae attain a length of 2 inches in *Desmognathus*, and about 4 inches in *Gyrinophilus*, and at that time lose their external gills, thereafter getting their oxygen through the skin and the walls of pharynx and throat. No *Plethodontidae* ever develop lungs. The purple salamander attains a maximum length of about 8 inches, while the dusky and the closely related mountain salamander are only about half as large. The two species of *Eurycea* reach a maximum length of about 5 inches.

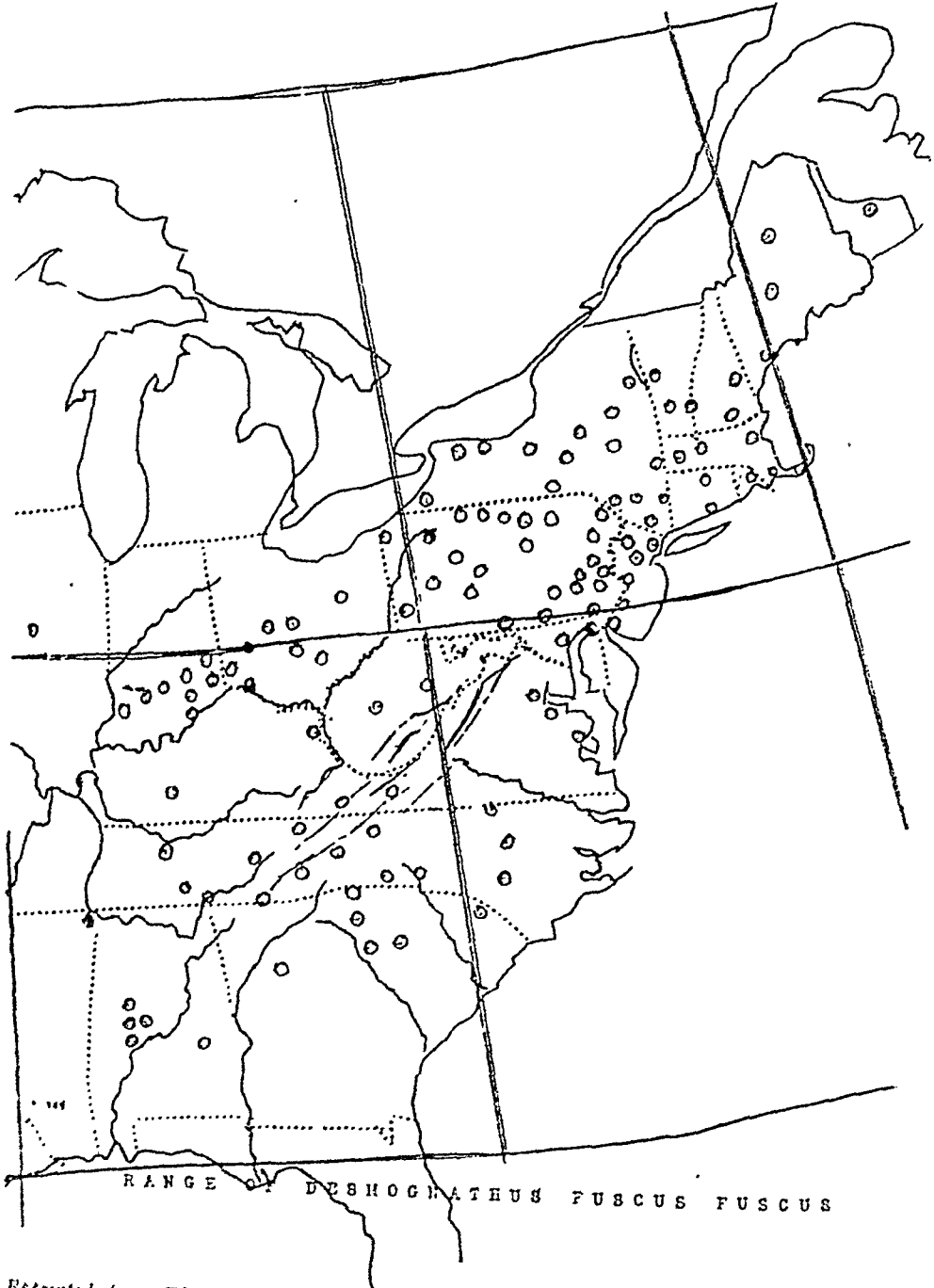
These types of salamanders are confined almost entirely to the Appalachian range, the *Desmognathus* extending somewhat further south, and the *Gyrinophilus* somewhat further north than the central part of the range. Their geographical distribution is well shown on the two charts copied from Dunn's book *The Plethodontidae*.<sup>4</sup> (See Figures I and II.)

We obtained the services of a member of the staff of the American Museum of Natural History<sup>5</sup> to study the distribution and habits of salamanders in the field. Making his first observations in February before the snow had melted from the hills he was able to find salamanders in more than two-thirds of the springs visited, including many which had been located and completely protected according to the recommendations of our State Department of Health. Most of them were remote from inhabited areas, provided with concrete spring houses, protected from surface drainage and surrounded by man-proof fences. Several of these which contained no salamanders on the first or second visit yielded them subsequently. Making his next round in May and June after the snow had melted and the ground was open, he was frequently unable to find salamanders in springs which had shown them formerly, though he soon came to the conclusion that repeated visits at favorable times would again disclose their presence.

The number of salamanders found by careful and continued intensive work on single springs is very surprising. We have taken more than 200 from a spring which frequently failed to yield even one on single visits. According to our evidence, most of the salamanders in any spring at a given time are buried deep within the layers of shale and the number out where they can be seen is very small in comparison with the total number present. In digging out springs we have captured salamanders 10 or 12 feet beyond the point at which the water came to the surface, and as deep as 6 or 8 feet.

In contrast to the usual distribution described, from the middle of May to the middle of June, and again from the middle of October to the middle of November, we found comparatively large numbers,

FIGURE II



Reprinted from *The Salamanders of the Family Plethodontidae*, by Emmett Reid Dunn

chiefly *Gyrinophilus*, on the surface of the ground during the night from 10 P.M. to 3 A.M.—although none could be discovered in the daytime.

During these periods the animals would wander to distances of over 65 feet from the spring in which they were living, and autopsies revealed that they were feeding during such wanderings. They were found wandering in the neighborhood of springs considered to be adequately protected from outside pollution, as well as near those

unprotected. Careful correlation of the number found wandering on land on certain nights with the temperature and relative humidity, failed to show any relationship. Usually one would find several salamanders at a single spring or else none (Figure IV). During the late spring and summer very few were seen on land.

For study of the movements of individual salamanders we passed a small copper wire through the tail just posterior to the anus and tied a numbered tag to this. By this means we have established the fact that individual salamanders wander freely up and down a stream (Figure V). By placing a large number of tagged salamanders in a spring, and after a period of several weeks digging out the head of the spring, we got some idea of how many of the salamander population we were recovering. Of 163 salamanders captured, tagged, and replaced in an experimental spring we recovered only 25, but captured 18 untagged salamanders which had uninjured tails and therefore were never tagged. A study of the possibilities of the distribution of the remaining tagged salamanders leads us to believe that they were buried in the shale along the main water current at a greater distance than we were able to dig out. Observations of salamanders removed from springs and placed at a distance proved that they possessed a sense of direction which enabled them to return regardless of the contours of the land over which they had to travel.

Bacteriological studies of the gastrointestinal tracts of salamanders show that many of them captured in both protected and

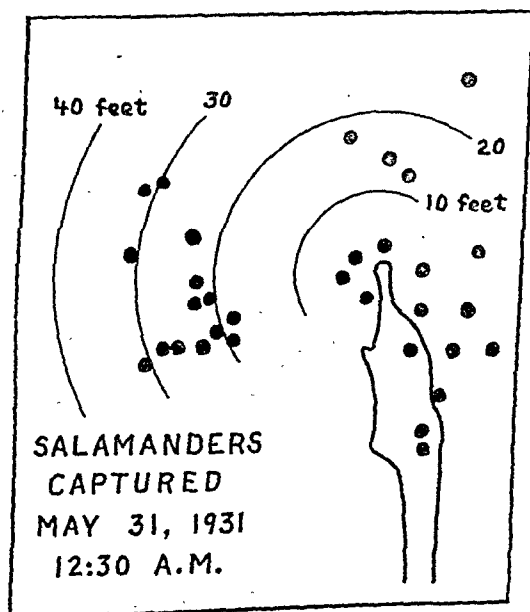


FIGURE III

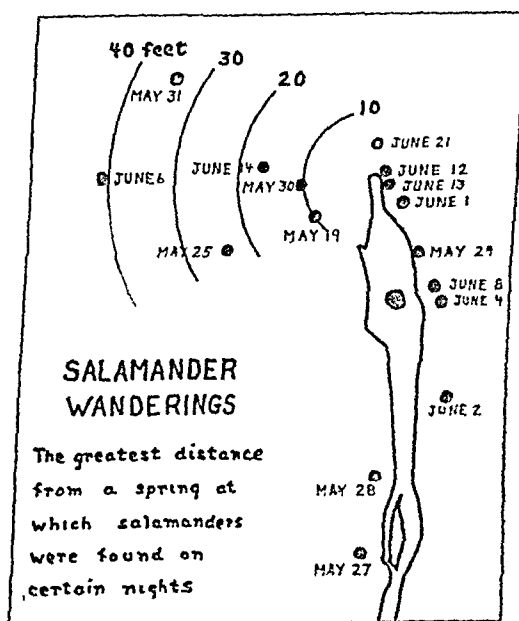


FIGURE IV

unprotected waters contain organisms of the colon aerogenes group. The season and kind of food available seem to influence this, as of 100 salamanders autopsied in February only 11 per cent showed *B. coli* against 66 per cent from a similar series taken from the same springs in May and June.

When placed in sterile water they expel colon bacilli. Our experiments indicate that starving salamanders contain no colon organisms, for we have repeatedly placed those throwing off *B. coli* in flasks of sterile water and, after making daily transfers to similar flasks for a few weeks, have been unable to find colon bacilli on autopsy.

On the other hand, we have very definite evidence that the salamander containing colon bacilli in its intestinal tracts continues to throw them off as long as the intestines contain material suitable for the growth of the organisms, acting as a reservoir or incubator. We fed a salamander *B. coli*, placed him in a tank of running water, gave sterilized food at intervals, and made daily tests of the water at the outlet, for 1 year. We recovered *B. coli* for 253 days. The output was irregular; some days every 0.1 c.c. portion was positive, occasionally, even early in the experiment, all cultures were negative. For the entire year 33 per cent of the 10 c.c. portions tested were positive, as shown in Table I.

There appeared to be no relation between the time of individual feedings and the number of colon bacilli thrown off. During the same period the city water used in the experiment showed only 0.5 per cent of the 10 c.c. tubes positive.

Additional evidence is shown by experiments wherein we fed *B. coli* to salamanders and then transferred them from flask to flask of sterile water, with occasional feedings of sterile food. One animal lived 122 days, and we obtained completely confirmed *B. coli* tests from the final flask; another gave off large numbers over a period of 71 days, when it was drowned. Some idea of the number of colon bacilli thrown off was obtained by plate counts on Endo's medium. The salamander that lived 122 days gave off an average of 36,000 *B. coli* per day, sufficient to contaminate 237 gallons of water so

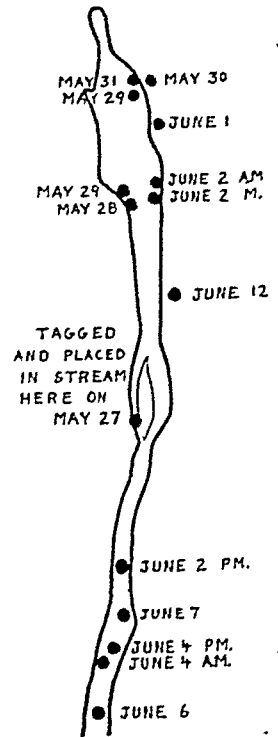


FIGURE V.—Wanderings of tagged salamander No. 29 (same scale as Figure IV)

TABLE I

Days of Experiment	10 c.c. Portions			1 c.c. Portions			0.1 c.c. Portions		
	No.	Pos.	%	No.	Pos.	%	No.	Pos.	%
1-50	220	150	68	88	37	42	88	31	35
51-100	210	100	48	84	30	36	84	14	17
101-150	210	142	68	84	26	31	84	18	21
151-200	210	71	34	84	0	0	84	0	0
201-250	210	39	19	84	3	4	84	0	0
251-300	210	4	2	84	0	0	84	0	0
301-365	290	8	3	116	0	0	116	0	0
Total	1,560	514	33	624	96	15	624	63	10

heavily that 40 per cent of the 10 c.c. portions will show *B. coli*. When we consider that we have found over 200 salamanders in one spring it becomes apparent that pollution from them can be quite significant.

In a series of experiments we either fed *B. coli* to salamanders or else permitted them to remain for short periods in a dilute culture of the organism, carried them in flasks of sterile water for several days, then autopsied them. Cultures of the skin, the mouth parts, the stomach and the peritoneal cavity were uniformly negative, while those of the upper and lower intestines showed *B. coli*.

About half of our cultures meet all the criterions suggested to us as identifying colon bacilli from fecal sources. These have included: methyl red, Voges-Proskaur, indol production, Eijkmann tests, Koser's citrate and uric acid tests, inosite and cellobiose fermentation.

What has been said of the ability of salamanders to continue to throw off *B. coli* after becoming infected also applies to the common newt, *Triturus viridescens*, found in large numbers in some open reservoirs. However, newts do not often wander on land after they once enter the water, although the middle portion of their life is passed entirely on land as the small animal known as the red eft. During this stage they can undoubtedly pick up *B. coli*.

Successful methods to eliminate salamanders from water supplies have not been found. No system of screens keeps them out, and walls sunk in the ground only force them to work their way through

the shale mantle rock beneath or to go around on the surface. A concrete wall sunk to bed rock would certainly stop them but this is not feasible, and all methods fail to eliminate those already present in the deep parts of the shale up the underground stream which feeds the spring. We know a spring which is really a dug well where the ground water has been intercepted at a depth of several feet and the bottom of which is covered with a thick layer of sand. This has never shown salamanders and all samples of water tested over a period of several years have been uniformly good.

Since the elimination of a suitable food supply will undoubtedly serve to decrease the salamander population we are preparing a spring by stripping the ground for a large area around the head and covering the surface with slag, believing that by keeping out earthworms we will decrease the chance of salamanders finding suitable food. We have established the fact that the salamander is unable to exist in water which shows a residual chlorine of 0.2 p.p.m., but have been unable to devise a method of applying chlorine at a point far enough above the spring to affect those residing in the depths of the shale, particularly since most of our springs are fed from several underground streams coming from different directions.

From an engineering standpoint we believe that in the Appalachian area it is desirable to revise our methods of protecting springs. In order to control salamanders it is necessary to build fences proof against both men and animals which will protect an area the boundaries of which will be at all points at least 100 feet from the spring or any outcropping of moisture above the spring. This area should be not only protected against surface drainage but so treated that it will be unsuitable for earthworm and insect life. Since the salamander requires a moist skin to maintain life, the protected area should be stripped so that the surface will be exposed to direct sunlight, and drained so that it will be as dry as possible at all times. Any overflow should be piped beyond the enclosure.

In conclusion may we outline our conception of the rôle that salamanders play in Appalachian spring water supplies. The salamanders live in large numbers buried deep within the shale along the underground streams. At certain seasons they come out from the deep recesses to the surface and travel distances of at least 65 feet overland. Here they feed on insects, worms, fly larvae, or similar living food. Should these be infected with *B. coli* through improper protection of the area from direct fecal pollution or surface drainage the salamanders become infected. Then they return to the depths

and throw off *B. coli* for a considerable time. Laboratory tests on such a water supply would suggest condemnation even though the supply was otherwise unpolluted.

## REFERENCES

1. *Gyrinophilus porphyriticus*—the purple salamander.  
*Desmognathus fuscus fuscus*—the dusky salamander.  
*Desmognathus fuscus ochrophaeus*—the mountain salamander sometimes called the Allegany salamander.  
*Eurycea bislineata*—the two line salamander.  
*Eurycea longicauda*—the long tail salamander.  
*Plethodon wehrlei*—the wehrlei salamander.  
*Plethodon glutinosus*—the slimy salamander.  
*Plethodon cinereus*—the red backed salamander.  
*Ambystoma maculatum*—the spotted salamander.  
*Triturus viridescens*—the newt or the red eft.  
*Cryptobranchus alleganiensis*—the hellbender.
2. *Pseudotriton ruber ruber*—the red salamander  
*Necturus maculosus maculosus*—the mudpuppy.
3. Bishop, Sherman C. *The Amphibians and Reptiles of Allegany State Park*. The University of the State of New York, 1927.
4. Dunn, Emmett Reid. *The Salamanders of the Family Plethodontidae*. Smith College Anniversary Series, 1926.
5. W. G. Hassler was kindly loaned to us by G. Kinsley Noble, Ph.D., Curator of the Department of Herpetology and Experimental Biology, American Museum of Natural History.

NOTE: This study was aided by an allotment of funds through the Division of Research, Milbank Memorial Fund.

## Transmission of Endemic Typhus Fever

SEVERAL months ago the announcement was made by the U. S. Public Health Service that endemic typhus fever, which has been recognized for several years in the United States, had been shown to be transmitted by fleas.

Additional studies indicate that the rat flea is the agent that transmits this condition. This work has been proved by laboratory experiments and by field studies, all of which have been conducted by the Service. There seems to be ample evidence that endemic typhus fever is spread from rat to rat by the rat flea, and from rat to man by the same agency.



# Getting Public Health Needs Across to Appropriating Bodies by a Municipal Health Department\*\*

HENRY F. VAUGHAN, D.P.H., F.A.P.H.A.

*Commissioner of Health, Detroit, Mich.*

IT is the writer's opinion that the first step in securing a sufficient appropriation for the maintenance of a public health service in a municipal health department is to formulate a program for the establishment of a whole-time health service. To be effective, such service must be manned with a qualified and trained personnel, and blessed with funds sufficient to carry on the essential work. Where funds are lacking, the program itself becomes the necessary fundamental but cannot be executed without the help of public opinion which must be aroused through a combination of the recognized means of health education. Public confidence and support demands a reasonable appropriation for public health service. It is obvious, however, that some individual or group of citizens must take the initiative in bringing the local needs to public attention. Appropriating bodies continuously feel the pulse of public opinion and are guided thereby. Newspapers, clubs, and civic organizations can be extremely helpful.

Not many years ago in one large city, the editor of the principal newspaper decided, after consultation with the health officer, that public opinion had not been aroused to the seriousness of the local tuberculosis problem. An intensive educational campaign was instituted with a 2-column bold type editorial on the first page of the home edition for 60 consecutive days. The stories were prepared by a clever newspaper man who had spent hours in the health department studying the situation and becoming familiar with the community needs for public health nurses and hospital facilities. When the appropriating body met a few weeks later, the politicians fell all over themselves in their endeavor to be first to champion the requested appropriation for clinic maintenance, the employment of public health nurses, and the construction of a sanatorium. These men had

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sensed popular opinion and were convinced that it was to their advantage to support these particular items.

The history of modern public health procedure in numerous cities throughout the country is replete with instances of this character, where citizens, committees, individuals, and groups, with newspaper support, have molded sentiment in favor of preventive medicine.

If we carefully analyze the Appraisal Forms approved by this Association, we will find no individual section of this measuring stick which deals with public health nursing. There are chapters on vital statistics, communicable disease control, venereal disease, and tuberculosis activities, the health of the child from prenatal to school service, sanitation, milk and food control, health education, and the laboratory service, but no division for nursing. However, a careful survey of the individual items which constitute the maximum rating of 1,000 points which any local health organization can obtain, will disclose the fact that, if we pick out those items toward which the principal contribution is from the public health nurse, the latter is actually responsible for approximately 45 per cent of the maximum rating, 450 of the total of 1,000 points. These include the evaluation of field nursing service, clinic service, health education, and the like. We may fairly conclude that in the modern health organization public health nursing service is responsible for nearly one-half of the entire program, and the health department is justified in expending nearly one-half of its budget for preventive service in its nursing division. Therefore, if we are to sell locally a modern health service, we must give particular heed to the establishment of a well organized, well qualified, efficient nursing staff. It naturally follows that in selling the health program, we must, of necessity, sell the nursing service.

The public health nurse is in a unique position in that her duties are such that her work is appreciated by the public more readily than that of others in the health organization. She becomes the family counsellor, she enters the home with a spirit of willing suggestion and hearty coöperation, she comes as a counsellor and as an adviser, and she endears herself to the hearts of the mothers and young children of the household. On the other hand, the physician or the inspector more frequently appears as the agent of the law, who inflicts quarantine or serves notices for the improvement of environmental sanitation. It is much easier to establish a program for the conservation of child life and the reduction of maternal mortality than it is to revolutionize milk and food sanitation by requiring pasteurization, or promulgate a housing code to wipe out slums and abate nuisances.

Each new friend cultivated and won over to the principles of infant hygiene and vigorous health for the school child becomes a propagandist in bringing popular opinion to the support of the health service.

A campaign for the reduction of infant mortality provides the health officer with his sales talk. A map of the city is prepared, showing the births and deaths under 1 year in each of the numerous sanitary districts into which the city has been divided. From these, we readily calculate the infant mortality. There will be districts in which the rate among infants is below the average; there will be others in which there are no deaths. On the other hand, there will be areas in which the death rate is far in excess of the average for the city. It is in such districts that a health department should intensify its educational program, establish its clinics, and release its public health nurses as home visitors. The results will be immediate. The mortality rate will decrease until it approximates or even falls below the average.

A map showing the loss in child life before and after the establishment of such a campaign becomes a potent tool in the hands of the health officer before his appropriating body. It is possible to show that with a given appropriation for nurses and clinic service a certain definite number of infant lives can be saved each year in the specified areas. These areas can be referred to specifically by giving the names of the streets forming the boundary. With the assurance of the health officer that for a given appropriation, he can save a specified number of lives, it takes a rather hardened body of politicians to refuse a reasonable appropriation. In other words, it can be shown that for a given expenditure a certain quantity of health can be purchased. Grant the health department the means with which to employ public health nurses, and infant lives can be conserved.

The public health nurse's prime function is to teach health. She plays an important rôle in every function of the health department which depends for success upon health education. On every occasion the health officer should endeavor to impress upon the public mind this important function of the nurse.

During the past 3 years, the Detroit Department of Health has been putting into operation a program of participation by the general medical practitioner in official public health procedure, the ultimate objective of which is to secure the sympathetic and wholehearted support of the medical profession in order that the general practitioner will not only practise curative medicine, but will actively take his part and share of the responsibility in the preventive medical program.

A beginning was made in the field of diphtheria prevention. All free clinics were abandoned and there were established a group of 1,100 coöperating physicians who have performed the service of immunization in their own offices. There has been a series of post-graduate conferences in communicable diseases which has assisted in standardizing the service and stimulating medical interest and coöperation. For service to indigents, physicians have been paid by the Department of Health at a modest rate.

To bring about the protection of a large number of children involves a 3-cornered coöperation between the public, the medical profession, and the department of health. The department, through its division of health education and through its nursing service, must instruct parents. The department must also prepare the medical profession for the service which it is to perform. Once the parent has learned what service is expected and the value of such service, and how much it will cost, you can be assured of at least the coöperation of the intelligent members of the community.

During the first few months of the Detroit campaign to stimulate public interest, the educational propaganda necessary to give impetus to the work included newspaper stories, paid advertisements, posters, lectures, bill-board advertising, radio talks, and the generous distribution of literature. The results were not noteworthy, as it was found that we reached approximately 18 to 20 per cent of the children who we estimated were in need of service. The plan was then conceived of expanding the educational program by having a house-to-house canvass made by public health nurses. The objective was to secure the protection, through immunization in the physicians' offices, of all children between the ages of 6 months and 10 years. For 4 months 112 of these health educators devoted their whole time to this work and canvassed a total of 163,402 families. At the time of the first nursing visit, it was found that 15 per cent of babies between 6 months and 1 year of age had already received protective treatment; 43 per cent of the preschool group; and 59 per cent of the school group were protected. As a result of this intensive sales-drive by the public health nurse, the per cent of protected children was increased to 52; that of the preschool child to 70; while that of immunized school children increased to 80. What better demonstration could we have of the results which the public health nurse can obtain by winning parental confidence and coöperation to such extent that 73 per cent of the children below the age of 10 years is actually protected against diphtheria?

Now you may inquire as to what bearing this campaign has upon

the problem of securing an appropriation for a nursing service. It has a very important influence. Public attention had been focused upon the needlessly high diphtheria death rate, and the city council had expressed its willingness to back any reasonable program and expenditure as long as results could be obtained. The diphtheria death rate has been cut to one-fourth and the health officer charges the responsibility for this reduction largely to the nursing service of the department of health. It becomes an extremely potent argument for appropriations.

Briefly, let it be said that the public health nurse is the largest single factor in the modern municipal health organization. In popularizing the work of the department, the health officer must inevitably bring forward the tremendous influence which the well trained nurse is manifesting in the reduction of the death rate and in the elimination of needless sickness and distress. May we again repeat that a plan for a well rounded, whole-time local health service is the first essential, and upon this foundation must be created a public confidence in the work of the public health nurse.

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## German Society of Pediatricians

THE Society of Pediatricians of Germany has recently issued a statement expressing its apprehension over the health of the children of Germany and Austria. The statement points out the general deterioration of the children's health; their low resistance to disease, the increase in the cases of tuberculosis, and other conditions similar to those prevalent in a time of famine. It warns the authorities against the dangerous consequence of further reduction of the expenditures for the care of sick children and for child welfare in general, and concludes by saying that "if economy must be effected it should not be at the expense of the children who are the future of the country."—*Gesundheitsfürsorge für das Kindesalter*, Berlin, 6, 6:457, 1931.

# Training in Administrative Procedures of Personnel for Child Health Work\*

JOHN A. FERRELL, M.D., DR.P.H., F.A.P.H.A.

*Associate Director, International Health Division,  
Rockefeller Foundation, New York, N. Y.*

PRESUMABLY, the principles of administration that should be taught to those who are to engage in child health work do not differ materially from those that should be taught to personnel that is to serve in other branches of the health department. Administrative procedures appropriate for the health department as a whole, and covering the work of its several branches, should be suitable for the bureau of child health work. Certainly the local health organizations of counties and towns cannot, as a rule, have special personnel for particular problems. The small staffs of these organizations have to spread themselves over the entire field of public health, including child health work; there is no possibility of special administrative procedures for special branches of the local health service. The personnel requires training that is broad and general; there is little chance for specialization.

Irrespective of whether the teaching in administrative practices is to be for specialists in child health work or some other branch of the health service, or for general workers in the field, certain questions will arise:

1. What persons or groups are to be taught?
2. What are to be their duties and what should they be taught?
3. How should public health training, the factor of greatest fundamental importance for progress in child health work, be made available for health personnel?
4. What is the outlook for the future?

The personnel to be taught includes present and prospective employees of national, state, and local health agencies, both private and governmental, principally the latter. There will be the technical and administrative staffs of the central organizations of the national, state, and city health services, and the general field workers of these agencies, and those of counties and towns, including health officers,

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nurses, and inspectors. Although the technical experts of the central organizations will always be relatively few, the field workers will be numbered by the thousands when local health services have been developed throughout the nation. Even now their number is exceedingly large. The following ratios of health personnel to population have been suggested by one writer: a medical health officer for every 20,000 inhabitants, a sanitary inspector for every 10,000 inhabitants, and a public health nurse for every 5,000 inhabitants. However, these ratios have been reached in only a few places.

The facilities necessary for effective child health work include practically all those supplied by the average health departments of states and cities. There must be provision for the collection and analysis of birth, morbidity, and mortality statistics; diagnostic and biological laboratory service; divisions for preventable and contagious diseases, for sanitary engineering, for local health services, including nursing; and services for dealing with special diseases and special problems. All of these branches, administratively and scientifically, are able to play essential parts in protecting the health of children.

Each division or bureau of a health service has a director or chief, who is expected to be a specialist or technical expert in his particular field. For example, the director of a bureau of child health work should be a first class pediatrician; through university courses he should have acquired special knowledge of public health, including public health administration; and he should be experienced in health organization work. Such a background of training should enable the director to maintain a harmonious relationship with the central health organization and its other bureaus, and with the local health organizations upon which he must depend for carrying out the measures in which he is particularly interested. He should be qualified to assist the chief executive in selecting competent personnel, and to give that personnel special training in his field. If he has assistants they should likewise have special technical and general public health knowledge to enable them to share in his many duties and responsibilities.

The staff members of local health organizations are general field workers; they correspond to general practitioners in medicine. They should all have a general knowledge of public health work, and each should have some special knowledge in order to carry out his or her share of the organization's program; but they are not expected to be technical experts in pediatrics, bacteriology, statistics, tuberculosis, or other specialties. These men and women should know the health laws, the rules and regulations of the health organization and its administrative principles. They should know how to plan and carry

out a program of work; how to reach and deal with problems in the home, the school, the clinic; how to accomplish results both by their own labors and by inspiring others to work. They should be teachers—translators of scientific knowledge into simple terms which the laity will understand. In short, they should be emissaries of health to all the forces of the community.

The impression that has prevailed in the past that any physician or any bedside nurse is qualified for public health work is now recognized to be wrong in responsible circles. The public health worker must have special training, since public health is a specialty for which specific knowledge and training are necessary. It would not be practicable to present here a detailed statement of all that should be taught to the prospective health worker. In general it may be said that the courses required for certificates or diplomas by the best equipped schools of public health would cover the essential special knowledge, including general administrative procedures. The directors of health bureaus and their associates should have had such courses, as should also the local health officers in so far as this is possible. The nurses should strive to take the courses required for university diplomas in public health nursing. University courses for sanitary inspectors have not been established or utilized to any great extent, consequently inspectors are very largely dependent for training upon the school of experience and training stations. University courses, then, should be taken by all health workers, and this instruction should be supplemented by field experience.

The question—How shall public health instruction be made available for health workers?—is perplexing. It is not yet practicable to restrict employment to health workers who have diplomas. Lawyers, doctors, and teachers, after going through transition periods, finally found it feasible to limit practice to those who meet legal tests as to preparation. When this stage may be reached in public health one can only guess. Certainly it is not near at hand. Eligibility qualifications in this new field will be difficult to enforce until there are more candidates for positions than there are positions. Present conditions as to compensation and security of tenure are too unsatisfactory to attract the best class of young men and women to public health work. Moreover, many of those now engaged in this work are not very promising persons. Many are not qualified to take university courses in public health because their basic education would not enable them to meet admission requirements or to carry college work. Many also have passed the age for successfully taking courses even if they had the necessary foundation. There is no



record available of the ages of nurses and inspectors in public health work, but it has been found that the average age of 225 full-time city health officers is 51 years, and the average age of 483 county health officers is 47 years. Of these 708 full-time health officers, only 102 are under 35; 68 are 35-40; 207 are 41-50, and 331 over 50. If the ages of the medical officers are to any degree indicative of the ages of the nurses and inspectors, it is obvious that the first step in approaching eligibility standards will involve the restricting of new appointments and replacements to young persons whose basic education is equal at least to university admission requirements.

Efforts to make it possible for young and capable health workers to have the advantages of university courses in public health have met with some success. Voluntary health agencies have granted fellowships in public health, covering tuition, travel, and living expenses. The health agencies themselves, recognizing that the problem is so large that private agencies would be barely able to scratch its surface, have in a few instances adopted a policy of giving study leaves with full or part pay to qualified employees. The potentialities for further development in this direction are large, but not large enough to meet the urgent problem of trained personnel with which health departments are now confronted.

Some training of field workers has been attempted by the technical and administrative staffs of the central health organizations, but this semi-tutorial instruction is expensive and irregular and interferes with routine work. In a few states the practical training of new or inexperienced personnel has been systematized. Training stations have been established. An experienced and university trained health officer, nurse, and inspector are assigned to the station—which is usually an efficient county department of health—to give the instruction. Small groups of physicians, nurses, and inspectors are admitted to the station for courses of from 6 to 12 weeks. These students observe efficient work and take part in it; they are taught by capable teachers who also appraise them as to aptitude. Their living expenses are paid by the state department, which frequently secures from private sources a part of the funds required for this purpose and also a part of the salaries of the instructors.

Alabama, Mississippi, Michigan, Missouri, and Tennessee have operated training stations during the past year or longer. The results are reported to be satisfactory. Aside from the teaching, these ably staffed county health organizations develop and demonstrate health procedures of a high order. They test the value of

established measures and improve them or develop better ones. Usually they carry on at least one epidemiological field study.

Thus it will be seen that although ideal conditions for supplying the best kind of health instruction for personnel are not uniformly available, the problem for the workers, in certain states at least, is gradually being simplified, and a foundation for suitable eligibility requirements is being laid.

The outlook for the future may be regarded as mildly encouraging. In normal times, funds for health work are obtainable somewhat more easily than formerly. A few trained workers are gradually infiltrating into the public health structure. The idea of trained personnel is gaining headway slowly in official and in lay circles. These developments are occurring in all the essential branches of public health service especially including that for child health.

#### SUMMARY

1. Public health training is needed for health officers, nurses, and inspectors of the local health services and for the administrative and technical experts of the central organizations.

2. These workers should be taught the subjects included in leading university courses in public health work and administration.

3. The instruction should be supplied by the universities; but as the present situation cannot be met in this way alone, the larger health organizations find it necessary to operate training stations.

4. The cost of training cannot be met as yet by the employees or candidates for positions. In a few instances it is being assumed by the state health departments, with such aid as they can obtain from private agencies.

5. Rigid eligibility requirements for health personnel cannot yet be enforced, except possibly as to age and academic education of new appointees; but progress in laying a foundation for suitable standards in the future is being made.

# Incidence of Sub-Clinical Mastitis\*

G. J. HUCKER, PH.D.

*New York State Agricultural Experiment Station, Geneva, N. Y.*

DURING recent years there has been a growing tendency to attribute an important public health significance to infections of the udder, particularly those due to a streptococcus. The relationship between septic sore throat epidemics and udders infected with streptococci has been one of the principal factors in focusing attention of public health officials upon this type of infection. Milk control officials have been interested not only because of the disease producing possibilities but also on account of the difficulty in actually reducing the number of organisms in milk from infected udders to an acceptable minimum.

The use of terms involving infections in the udder has become somewhat confusing. The term "mastitis" has been roughly applied to all types of udder infections with no consideration of the degree or type. At the outset it should be understood that a discussion of mastitis does not of necessity include the problem of the milk-borne septic sore throat epidemic. Udders harboring organisms responsible for these epidemics have probably become contaminated from a human source with a type of streptococcus distinct from those found in other forms of mastitis. Udders infected with the mastitis type of streptococcus may never be involved. In other words, ordinary mastitis is not the cause of epidemic septic sore throat. On the other hand, infection with *Streptococcus epidemicus* or *S. pyogenes* may produce the same pathologic and clinical picture in the udder as infections (mastitis) caused by the more common bovine streptococci. This discussion does not include udders infected with the human type of streptococcus.

Mastitis brought about by bovine streptococci, and possibly in some instances micrococci, may be found in two or three clinical forms. The *acute* or *clinical* type is relatively uncommon. The symptoms include an extreme toxic condition, with swollen and highly inflamed udder. The cow is prostrated. Little or no milk can be drawn from the offending quarter. A purulent discharge is usually

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present. A distinct rise in temperature is noted. No special methods of detecting this type of infection are necessary as the condition is obvious.

In contrast to the acute or clinical mastitis is the more common *sub-clinical* type, in which the cow may appear practically normal. There is no toxemia, little or no rise in temperature, and the udder may not show any swelling or inflammation. The milk may be normal in appearance with the possible exception that a few flakes may be seen when strained through fine gauze or wire screens. In aggravated cases pus may be present. A "watery" condition of the milk may be noted in certain instances. The cow appears normal and remains in the milking line. The incidence of this sub-clinical type of mastitis or low grade infection of the udder is the subject of this discussion.

To secure information as to the prevalence and importance of sub-clinical mastitis, two or three samples of milk were secured at intervals from each quarter of approximately 200 cows. These were submitted to the usual laboratory examinations for the detection of mastitis, *i.e.*, cell count, reaction (brom-thymol-blue), amount of lactose, chlorides and catalase present and plating upon veal infusion as well as blood agar. The samples were also incubated over night at 37° C. and examined microscopically for long chained streptococci.

A manual examination was made by a competent veterinarian of each cow, to determine the presence of fibrosis or induration of the udder. Subsequently approximately all were examined post-mortem, and the presence of fibrotic and indurated tissue as well as of pus pockets was noted in the udder.

Of the milk from 439 quarters, 48 per cent showed streptococci (Table I) as evidenced by the presence of streptococcus-like colonies on veal infusion and veal infusion horse blood agar plates. These varied from a few hundred colonies per c.c., to a maximum, in one instance, of over 5,000,000 per c.c. The greater proportion of the quarters carrying streptococci showed less than 100,000 per c.c. Only

TABLE I  
NUMBER OF QUARTERS OF COWS WITH NO CLINICAL EVIDENCE OF MASTITIS, WHICH CARRIED STREPTOCOCCI

<i>Number of Streptococci</i>	<i>Number of Quarters</i>	<i>Per cent of Quarters</i>	<i>Per cent of Quarters Showing Pus upon Post-mortem</i>
No streptococci	239	52	2
Streptococci present	200	48	17.5
Less than 10,000 per c.c.	71	16	
10,000 to 100,000 per c.c.	83	20	
More than 100,000 per c.c.	46	12	

Total quarters which showed pus=9 per cent.

12 per cent of the total number of quarters studied carried streptococci in larger numbers than 100,000 per c.c.

A post-mortem study of the quarters which showed streptococci in any number in the milk indicated that nearly 18 per cent showed pus, against only 2 per cent of those of the milk which showed no streptococci. In only 9 per cent of all quarters examined could pus be found upon autopsy.

Further study of the quarters which showed no streptococci by the use of cultural methods indicated that, by direct examination of the incubated milk, in certain instances long chain streptococci could be demonstrated. It is of interest to know that these particular quarters which showed streptococci upon microscopic examination and did not evidence any streptococcus-like colonies upon agar plates were found to contain pus upon post-mortem. With few exceptions the milk from all quarters which showed pus post-mortem showed streptococci either culturally or microscopically.

It has become common practice among veterinarians to detect the presence of abnormal tissues by manipulation of the udder. These are usually fibrotic or indurated. The presence of this fibrosis and induration has been interpreted by those who lay stress upon physical

TABLE II  
NUMBER OF QUARTERS SHOWING FIBROSIS UPON POST-MORTEM

	<i>Number</i>	<i>Per cent</i>	<i>Per cent Showing Pus upon Post-mortem</i>	<i>Per cent Showing Streptococci in Milk</i>
Marked fibrosis	298	66	14	37
Slight fibrosis	52	10	4	41
Normal	78	24	1+	22

examinations as indicating the presence of mastitis. A study of 428 quarters (Table II) which had been subjected to careful physical examination indicated that approximately 76 per cent showed fibrosis to some degree. Subsequent post-mortem indicated that, with very few exceptions, the results of physical examination could be confirmed by autopsy findings, showing that fibrosis and induration of the udder may be accurately detected by a competent veterinarian. The significance of this fibrosis, however, is still a debatable question.

Only 24 per cent of all of the quarters examined failed to show fibrosis or induration. Of the 24 per cent non-fibrotic udders only 1 per cent showed pus upon post-mortem, while 22 per cent showed streptococci in the milk. On the other hand, of the quarters which were fibrotic to some degree, 18 per cent showed pus upon post-mortem, and 78 per cent streptococci in the milk.

TABLE III

NUMBER OF INDIVIDUAL COWS WITH NO CLINICAL EVIDENCE OF MASTITIS WHICH CARRIED STREPTOCOCCI

<i>Number of Quarters</i>	<i>Number of Cows</i>	<i>Per cent of Cows</i>	<i>Per cent of Cows Showing Pus in One or More Quarters upon Post-mortem</i>
No streptococci in any quarter	26	22	2
Streptococci in one or more quarters	92	78	25
Streptococci in one quarter	40	34	17
In two quarters	35	30	25
In three quarters	13	11	34
In four quarters	4	3	25

Cows showing pus (post-mortem) in one or more quarters=21 per cent.

It has been intimated by certain investigators that a large percentage of cows harbor pus pockets in the udder, the organisms from which may be thrown off intermittently into the milk supply, and unless regular examinations are made these pus pockets may remain undetected.

An autopsy examination of 560 quarters showed that slightly more than 9 per cent contained pus pockets. On the other hand, 21 per cent of the cows (Table III) studied showed pus post-mortem in one or more quarters. The detection of these animals by cultural methods proved to be extremely unsatisfactory. Of 151 quarters in which pus was found post-mortem, only 20 per cent showed streptococci in the milk, and approximately 35 per cent gave no indication by chemical tests, viz., amount of chlorides and lactose, that the milk might be abnormal. In other words, more than half of the quarters which on autopsy were found to harbor pus pockets were secreting milk which gave no evidence of the presence of pus in the udder tissues by cultural examination.

It has been thought that the presence of fibrosis and induration in the udder indicates an infection. A study of 440 quarters (Table IV) showing fibrosis indicated that 78 per cent showed streptococci in the milk. In other words, 22 per cent of all the quarters which showed fibrosis to some degree failed to show streptococci in the milk,

TABLE IV

RELATION OF QUARTERS WHICH CARRIED STREPTOCOCCI TO THE PRESENCE OF FIBROTIC TISSUE UPON POST-MORTEM

<i>Number of Streptococci</i>	<i>Number of Quarters</i>	<i>Per cent of Quarters Showing Fibrosis</i>		<i>Per cent Showing No Fibrosis</i>
		<i>Marked</i>	<i>Slight</i>	
No streptococci	236	54	13	32
Streptococci present	204	62	16	21
Total	440	58	14	27

TABLE V

INCIDENCE IN HERDS OF FIBROSIS AND PRESENCE OF STREPTOCOCCI

<i>Herd</i>	<i>Number of Cows</i>	<i>Per cent of Quarters Showing Fibrosis upon Post-mortem</i>	<i>Per cent of Quarters which Showed Streptococci</i>
I	14	66	
II	12	78	
III	26	98	48
IV	17	80	36
V	10	65	60
VI	14	75	48
			35

which indicates that fibrosis does not necessarily signify the presence of an active infection. It is more reasonable to assume that this fibrosis and induration is the result of infection rather than an indication of the presence of infection. The presence of these abnormal tissues indicates either a *present* or *past* infection.

Physical examination of 221 cows from a typical dairy district showed that only 7 per cent did not give evidence of some degree of fibrosis or induration in 1 or more quarters. Further study of this 7 per cent also revealed that all of the remaining cows, with 1 exception, either carried streptococci or showed pus upon post-mortem in 1 or more quarters. In other words, only 1 of 221 cows studied was found to be free from fibrotic tissue, pus, or streptococci in all 4 quarters. Further tests no doubt would indicate some type of abnormal condition in one of the quarters of this remaining "normal" cow.

In certain instances (Table IV), as high as 98 per cent of all of the individual quarters in herds were found either to carry streptococci or show the presence of fibrotic tissue in the udder.

#### CONCLUSION

Sub-clinical mastitis is relatively common and without careful laboratory control or veterinary inspection may remain undetected. Physical examinations, supported by autopsy observations, indicate that as high as 98 per cent of the quarters in certain herds may show fibrosis or induration. This condition probably signifies previous as well as present infection.

In nearly one-half of all of the quarters studied streptococci could be demonstrated by cultural or microscopic methods, the percentages being greater in quarters showing fibrosis.

Approximately one-fifth of the 221 cows autopsied showed pus pockets in the udder. The milk secured from these animals prior to autopsy gave no indication, culturally, in more than one-half of the cases, that the udder might be abnormal.

# Postgraduate Study in Child Hygiene in the United States and Canada\*

RICHARD M. SMITH, M.D.

*Pediatrician, Boston, Mass.*

IN order that I might inform myself accurately with reference to the opportunities for postgraduate study in child hygiene in the United States and Canada, I have written to all the medical schools offering postgraduate courses and to the schools of public health. I was surprised to find in studying the replies to the letters, and in investigating the catalogues and announcements which were sent to me, that the opportunities for postgraduate work in child hygiene are extremely limited.

Most of the medical schools as a part of the undergraduate work in connection with the department of pediatrics give some instruction on the care of well children and give the students a chance to observe the work of so-called well baby clinics. A number of medical schools also offer postgraduate courses in pediatrics which include the same type of instruction in the care of well children. Very few of the schools go further than this, and none offers complete systematic courses in child hygiene. Undoubtedly one's knowledge of certain aspects of child hygiene would be furthered by taking a postgraduate course in pediatrics in any one of the many well recognized medical schools. These courses, however, cannot be considered in any sense courses in child hygiene, and therefore no attempt has been made to analyze the instruction given. This matter has been thoroughly presented in the report on pediatric instruction prepared by Dr. Borden Veeder for the White House Conference on Child Health and Protection.

If we turn next to the schools of public health we find that there is a surprising lack of systematic instruction in child hygiene. There are courses offered which cover certain aspects of the subject, but complete courses are given in only 2 schools, Johns Hopkins and Harvard. In various universities courses are offered which present certain aspects of child hygiene.

\* Read before the Child Hygiene Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 17, 1931.



At Yale, in the School of Bacteriology, Pathology, and Public Health, there is a short elective course on infant welfare which includes lectures and discussions in regard to the technic of the organization of the campaign against infant mortality including prenatal work, administration of infant welfare stations, and public health education as related to infant hygiene. This occupies 2 hours a week during the spring term.

In the Graduate School of Education an opportunity is given through the Yale Psycho-Clinic for research in the field of child development and child hygiene with special emphasis on the period of infancy.

In the course in public health administration considerable time is given in class, and several hours in the field, to child health clinics and to health work in the schools.

There is also a course in school hygiene dealing with the problems of school sanitation and with the objectives and methods of organization involved in the supervision of the health of the school child. This course consists of 2 hours a week for 1 term.

A course in practical field work in public health offers an opportunity for direct clinical experience in various fields of municipal health department activity, and this, of course, includes observation of work in child hygiene.

At the University of Toronto, School of Hygiene, there are clinics on communicable diseases and also students attend well baby and prenatal clinics, but there is no course in child hygiene.

At Columbia University, under the DeLamar Institute, there is a course devoted to preventive medicine and public health administration occupying 1 hour a week for 3 semesters. Also, in the summer session there is a course on school health inspection and school health supervision emphasizing mental hygiene and another emphasizing physical education.

At the University of Minnesota, through its Institute of Child Welfare, there is a course in child welfare leading either to a master's or doctor's degree. Lectures include such subjects as, child training and child psychology, physical development, care and development of the young child, parental education, and mental examination of the preschool child. Courses are held at various times throughout the year and cover quite fully this aspect of the subject. The Institute of Child Welfare offers a particularly fine opportunity for students wishing to do special work in this department of child hygiene.

At the University of Iowa, in the summer courses in child welfare,

there are opportunities for the study of various phases of child hygiene. One course of 5 hours a week for 6 weeks gives an introduction to child development. A second one on nutrition is a series of lectures dealing with the principles of nutrition with special emphasis on their relation to child health and the technics of feeding. There are also several courses on child psychology, one on physical growth, and another on genetics. There are several courses on the social aspects of child hygiene, such as parent education and the child in the home. There are also opportunities for field work in research in physical and mental measurements.

At the Massachusetts Institute of Technology, in the department of biology and public health, there are several courses on health education. A course is given 2 hours a week for the first semester which is a consideration of the procedures and methods used by health and school departments in health education. Practical field work is given to allow the student an opportunity to study and participate in these activities. A similar course is available also as a summer course.

Another course in school health administration, given 1 hour a week during half a year, deals with the organization of the health work expected from teachers, doctors, nurses, physical educators, nutrition workers, and others, presenting the objectives and measurements of accomplishment for each phase of the work.

Boston University offers through its school of education a course on health education 2 hours a week throughout the year, discussing desirable habits, knowledge, and activities with an appreciation of a health education program as a vital part of the school system. A second course, given 2 hours a week, is designed primarily for those interested in working out a coöperative program in health education. A third, given 2 hours a week, deals with the principles and problems in the administration of health education programs. This is a somewhat more comprehensive course designed primarily for graduate students and teachers in active service, and is planned to give lay instruction in such matters as first aid, school feeding, mental hygiene, health teaching in elementary and intermediate grades, physical education, athletics, and so forth.

At Johns Hopkins University, under public health administration, an elective course in child hygiene is offered 2 afternoons a week for half a year, which includes lectures on the historical development of child health work in the United States and in foreign countries and the present purposes and methods of child hygiene activity. There are demonstrations and field work through milk stations, open air schools, schools for correction of defects, tuberculosis, and so forth.

Students are required to attend field demonstrations of child hygiene activities and are assigned topics for study. This is a comprehensive course and covers quite completely the entire range of child hygiene.

At the Harvard School of Public Health there is a course on child hygiene 3 mornings a week for 4 months with field work taking all day for 4 months. This field work is done in conjunction with the course on public health administration. The time of the course is devoted to the general discussion of the subject of child hygiene including a considerable amount of work on normal growth and development. Students are given a chance to observe various phases of child hygiene work, prenatal clinics, postnatal clinics, child welfare clinics, and work among school children, and also with special groups such as the handicapped, feebleminded and blind presented through the work of special institutions dealing with each group. There are also two other elective courses in child hygiene for students who have completed the first course in which intensive work may be had in the various branches of child hygiene or in which research in some particular subject may be undertaken.

From a consideration of the type of instruction offered in the graduate schools of medicine and in the universities and in schools of public health it is obvious that there is a widespread recognition of the importance of work with children and that certain phases of the subject receive adequate presentation. It is equally clear that except in 2 instances there is no evidence of a comprehensive vision of what child hygiene means. It would seem not out of place to state briefly some of the fundamental considerations which should be recognized by anyone who wishes to perfect himself or herself in this phase of public health work.

Child hygiene is the offspring of two definite aspects of medical work. In the first place, it is directly and intimately connected with pediatrics. It has to do with everything which concerns the well child, especially with normal growth and development and their determining factors. In the second place, in its practical aspects it is an important department of public health administration. It is, of course, true that a great deal of valuable child hygiene work has been and is being done under auspices other than public health authorities, federal, state, or municipal, but, nevertheless, from an organization point of view it is and should be a part of organized public health work.

Because of this double origin of child hygiene it follows that the leaders in child hygiene must have adequate training in both pediatrics and public health administration with its related subjects

of vital statistics and sanitary engineering. In the past child hygiene has been inadequately taught in our medical schools and its importance insufficiently recognized in pediatric departments. Fortunately at present almost all of the pediatric departments in the medical schools in this country and Canada recognize the importance of child hygiene or preventive pediatrics, as it is frequently called, and students receive a considerable amount of, although necessarily inadequate, instruction in this phase of work with children.

There is obviously a need for more comprehensive courses in child hygiene in connection with the postgraduate departments of medical schools and universities and the schools of public health. Distinct child hygiene departments should be established which would develop opportunities for study of the whole field.

From an administrative point of view in the past the direction of child hygiene work has been intrusted too often to lay persons whose only qualifications were based upon interest in and sympathy for children, or to trained nurses who have had no more special training in work with children than is given in a small children's ward in a general hospital. The time has passed when child hygiene can be linked in administrative work, with public health nursing, or any other division of a public health department. Child hygiene deserves a division of its own presided over by an adequately trained physician who has had special postgraduate work in pediatrics and additional training in public health administration. Until the important positions in child hygiene are filled by persons of such training child hygiene work will continue to be unsatisfactorily done. In order to train such individuals we must demand an increasing amount of preliminary medical education, particularly specialization in the field of pediatrics, and several years of special study including practical experience in the field.

#### SUMMARY

Instruction in child hygiene may be obtained at the present time under 3 auspices. First, in postgraduate work in pediatrics conducted by various medical schools. These courses do not deal with child hygiene as such, but a considerable amount of valuable information concerning well children and normal growth and development is presented. For further details one should consult the report on pediatric education prepared by Dr. Borden Veeder for the White House Conference on Child Health and Protection.

Second, in connection with undergraduate and postgraduate instruction in certain special schools in various universities. These courses are also fragmentary, considering various aspects of the child hygiene problem but not attempting in any way to cover the entire field of child health. The better organized of these courses are as follows:

At Yale courses on infant welfare, school hygiene, and municipal health department activity.

At the University of Toronto, a course in school hygiene.

At Columbia University, courses in preventive medicine and public health administration, school health inspection, and school health supervision.

At the University of Minnesota, a course in child welfare.

At the University of Iowa, courses on child development, nutrition, and child psychology.

At the Massachusetts Institute of Technology and Boston University, courses on health education.

Third, fairly complete but somewhat superficial courses in connection with schools of public health at Johns Hopkins and Harvard.

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## Good Eyesight in Industry

IN my organization, during 8 years, approximately 11,000 pairs of eyes were examined at the Pullman Car Works, with 25,843 separate visits. Of these, 42 per cent achieved normal vision (some had normal vision while others required glasses to make them normal). Fair vision was obtained in 37 per cent with or without glasses. This makes 79 per cent with good or fair vision in both eyes, leaving 21 per cent with poor or bad vision in one eye or both, that glasses could not help. Of this 21 per cent, 0.6 per cent were one-eyed men.

This does not mean that 21 per cent had at least one bad eye since some of the examinations were preemployment and were rejected, others were employees of interlocking companies and others were pensioners.

Good eyesight obviously reduces the employer's compensation payroll and also the salvage bill. This far overshadows the cost of medical care and the cost of protective goggles—not to speak of the humanitarian phase of the question.

The eye requirements at selected positions in an industrial plant are summarized in a table from which the following excerpts are taken:

*Without glasses*, crane operators should have a vision of 20/30 or better while transportation employees should have 20/20 in addition to color tests. Other employees involving machinery, woodworking, welding, etc., should have 20/40. *With glasses*, transportation employees should have 20/20, transfer table employees 20/20 one eye, 20/30 the other, while all the other groups mentioned should have 20/30.—

Herman P. Davidson, *Sight-Saving Rev.*, 1, 4: 38-41 (Dec.), 1931. E.R.H.

# Food Poisoning Due to Toxic Substances Formed by Strains of the Cloacae-Aerogenes Group\*

RUTH GILBERT, M.D., F.A.P.H.A., MARION B. COLEMAN  
AND ALICE B. LAVIANO

*Division of Laboratories and Research, New York State  
Department of Health, Albany, N. Y.*

AN increasing variety of bacterial species including *B. cloacae*, *B. proteus*, and staphylococci, is being found to incite gastrointestinal disturbances following the consumption of food containing these microorganisms or their toxic products, as is exemplified by the work of Buchanan and Megrail,<sup>1</sup> Bengston,<sup>2</sup> Baerthlein,<sup>3</sup> Ilsley,<sup>4</sup> Dack and his coworkers,<sup>5</sup> Jordan,<sup>6</sup> Ramsey and Tracy,<sup>7</sup> and Barber.<sup>8</sup>

Early in October, 1930, an outbreak of gastroenteritis attributed to cream-filled pastry occurred, the outstanding epidemiological features of which were described in *Public Health News* of New Jersey<sup>9</sup> and *Health News* of New York.<sup>10</sup> At least 125 cases were reported to have developed on 2 successive days in an area approximately 20 miles square, those occurring on the first day being confined chiefly to the southern part of the district. The symptoms were said to have been manifested in every case within a few hours after the eating of either cream puffs or chocolate éclairs manufactured by a wholesale bakery. A few of those who ate the pastry noticed a metallic or gaseous taste, but most of them did not report any unpleasant taste or odor. The illness was characterized by violent and prolonged nausea and vomiting, followed by a profuse diarrhea and, in some instances, cramps affecting the leg muscles. No rise in temperature was noted. The symptoms generally subsided in from 4 to 10 hours. The description of the cases occurring on the second day indicated that they were markedly more severe than those of the first. In fact, the administration of morphine was required in many instances.

The bakery was visited by a member of the laboratory staff on the day following the outbreak. It was in a concrete building which

\* Read before the Laboratory Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 17, 1931.

appeared to be so constructed that few rats and mice could gain entrance. Traps, but no poisons, were used. The work rooms and all utensils were scrupulously clean, and containers had properly fitting covers. The method of preparing the cream filling was as follows: Eggs, cornstarch, and milk powder were mixed, poured into a sugar solution previously heated, and cooked with constant stirring until thick. The material was heated to approximately 100° C., but was kept at this temperature for only a very short time, then left in a covered, tin mixing-bowl, at room temperature, for 4 or 5 hours before the shells were filled. The pastries were kept in a refrigerator overnight and distributed by automobile truck on the following morning.

The eggs were obtained from a firm which handles "cracked eggs," which are removed from the shells, put in tin cans, and distributed to bakeries, restaurants, etc. The eggs used on the second day were said to have been taken from a half-filled can which had been in the refrigerator overnight. None of this lot was available for examination and the can in which they were shipped had been discarded.

Six specimens were secured of cream puffs and chocolate éclairs, some of which were portions of those eaten by individuals who were ill. Unfortunately, only those distributed on the second day were available. Fecal specimens were obtained from 7 patients. Examination of the filling failed to show evidence of chemical poisons. None of the species generally associated with enteric disease were found in any of the specimens. *Staphylococcus aureus* was present in large numbers in the cream filling of the 6 pastry specimens and was also found in 2 fecal specimens.

In a study of a representative strain of these organisms isolated from the filling, a monkey was fed with 5 c.c. of a 48-hour culture grown in medium containing ingredients similar to those used in the pastry filling; a guinea pig and a mouse were inoculated intraperitoneally with 2 c.c. and 1 c.c. respectively of a filtrate from it; a rabbit was inoculated intravenously with 3 c.c. of this filtrate, and another with the same amount of the filtrate from a broth culture. None of the animals showed any evidence of illness.

From 5 fecal specimens and from the filling of 5 cream puffs or éclairs large numbers of nonmotile, Gram-negative, encapsulated bacilli were isolated, the growth products of which proved toxic for certain animals. The biochemical reactions indicate that the strain belongs to the cloacae-aerogenes group, although it does not correspond

exactly to any species for which a description could be found. With one possible exception, no evidence of motility has been demonstrated. Two stained films of one culture, however, have shown monotrichous

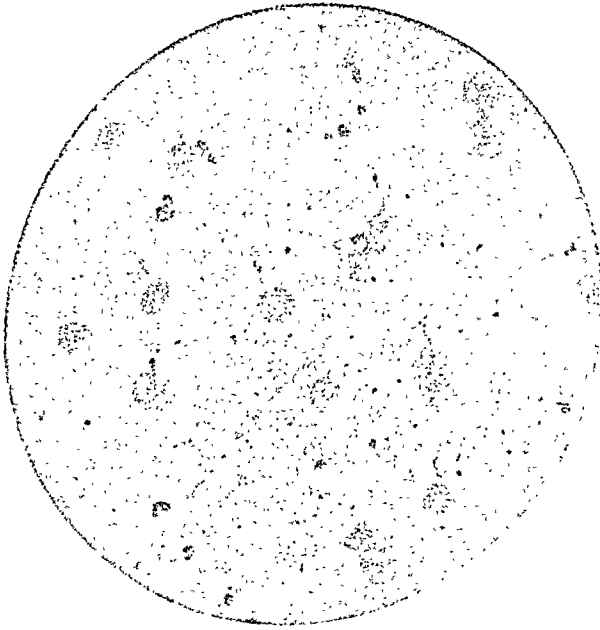


PLATE I—ORGANISMS SHOWING CAPSULES AND MONOTRICHOUS FLAGELLA.  $\times 1,000$  DIAMETERS.

flagella (see plate I). Dextrose and lactose are fermented, at least three times as much gas being produced in the former and about twice as much in the latter as is formed by *B. coli*. Saccharose, maltose, mannitol, glycerol, inositol, and starch are also fermented, while dulcitol and adonitol are not. The majority of the strains liquefy gelatin very slowly, requiring from 8 to 14 weeks at from  $35^{\circ}$  to  $37^{\circ}$  C. Litmus milk is acidified and coagulated; indol is not produced. Acetyl-methyl-carbinol can be demonstrated in dextrose broth (Voges-Proskauer positive) after 24 and 48 hours' incubation, but not after a longer period; the reversion of reaction in 0.5 per cent dextrose-phosphate-peptone solution (methyl-red negative) is rapid, occurring within 24 hours. As our experience would indicate that this group of organisms is not frequently found, in considerable numbers at least, in human feces, the presence of the particular strain described in 5 of 7 of the stools from persons ill following the eating of the cream puffs is of significance.

Antiserum produced with 1 strain (No. 328) isolated from the cream-puff filling agglutinates to its full titer the other 9 strains. With one exception, no appreciable reaction with other available strains of the cloacae-aerogenes group was obtained. A culture isolated in the branch laboratory in New York City from cream-pie



filling, to which were attributed 2 cases of food poisoning in 1 family, was agglutinated to one-half the titer of the antiserum. This culture is motile and differs slightly from No. 328 in biochemical reactions. It liquefies gelatin rapidly and ferments dulcitol but fails to ferment glycerol and starch; acetyl-methyl-carbinol is demonstrable in dextrose broth for 7 days. Its toxicity has not as yet been determined.

A medium similar to the pastry filling, as well as beef-infusion broth, was used for studying the toxigenicity of strain No. 328. The custard medium was prepared according to the following formula:

CUSTARD MEDIUM

225 c.c.	Milk
100 c.c.	Water
53 gm.	Saccharose
15 gm.	Cornstarch
0.5 gm.	Sodium chloride
1	Egg
3 c.c.	Vanilla extract

Place the milk and 80 c.c. of water in a double boiler and heat until a scum forms. Mix the sugar, cornstarch, and sodium chloride with the remainder of the water and add the well beaten egg. Combine with the hot milk and cook slowly until thick. Distribute in flasks or tubes and sterilize in an autoclave at 115° C. for 20 minutes.

Unless otherwise stated, all cultures of No. 328 used for feeding or inoculation were incubated for 24 hours, while filtrates tested for toxicity were obtained from 48-hour cultures. No evidence of toxicity for mice or guinea pigs was observed following the feeding of custard-medium culture or subcutaneous inoculation with broth culture. Intraperitoneal inoculation with 1 c.c. of broth culture was followed in mice by diarrhea within 1 hour, and by death of both mice and guinea pigs within 24 hours; animals of both species remained alive and well after similar inoculation with culture filtrates.

A monkey was fed approximately 5 c.c. of a 48-hour culture in custard medium, subsequent to which diarrhea, but no other symptoms of illness, was observed. Two hens fed custard-medium culture and 1 inoculated intravenously with broth culture developed diarrhea within from  $\frac{1}{2}$  to 3 and 6 hours, respectively. Rabbits inoculated intravenously with from 0.1 c.c. to 5 c.c. or fed with from 2 c.c. to 5 c.c. of filtrate from the custard-medium culture developed diarrhea within from 15 minutes to 6 hours, but usually recovered.

Similar results were obtained with this material after it had been heated to 100° C. Broth-culture filtrates caused diarrhea when given intravenously, but no symptoms were observed after feeding such

filtrates to rabbits. A kitten fed about 20 c.c. of a 24-hour culture grown in the custard medium showed no ill effects.

The epidemiology clearly points to cream puffs and chocolate éclairs as the source of intoxication. Since the cream filling was said to have been prepared each morning, a common vector is indicated. All the ingredients except the eggs and water were dry and it was understood that portions of material from the same lots were used both before and after the outbreak.

The data suggest, therefore, that the etiological agent might have been introduced by means of the eggs, which may have been contaminated from the shells, the persons removing them from the shells, or some other source. Although the mixture was cooked after the eggs were added, it is conceivable that a portion of the custard, especially that adherent to the kettle near the top, may not have been heated sufficiently to destroy the bacteria. Furthermore, if the toxin of the organisms of the *cloacae-aerogenes* group described had already been formed, it might not have been rendered inactive by the method of cooking employed.

While the pastry was said to have been kept in the refrigerator overnight, ample time elapsed for incubation of the bacteria during the 4 or 5 hours the cream filling was left at room temperature before the pastry shells were filled, and again the following day when the finished products were being distributed by truck, the temperature being unusually high for that season.

The highest standards of cleanliness cannot prevent contamination of food from dust, utensils, egg shells, and other similar sources which are known to harbor numerous so-called saprophytic microorganisms. Certain of these bacteria, in themselves innocuous, under favorable conditions produce substances which, if ingested, may prove markedly toxic. The frequent reports of outbreaks of food poisoning following the consumption of pastries containing cream-custard filling suggest that this material—possibly owing to the egg content—furnishes an excellent medium for the development of harmful bacterial products. Although the subjection of these foods to temperatures necessary for sterilization is not practicable, the production of toxic substances can be averted by continuous refrigeration during the brief period before distribution to the consumer.

The handling and refrigeration of "cracked eggs" may need more careful supervision. It seems important that steps be taken to control the preparation and distribution of all cream-custard food products, as well as to disseminate information to the public to insure necessary precautions on the part of the consumer.

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## Dental Research

AN important symposium on the cause and nature of tooth decay was held June 23 in Pittsburgh, at the Frick Training School, under the auspices of the Pittsburgh Section of the International Association for Dental Research. The main papers were presented by Dr. H. E. Friesell, Dean of the University of Pittsburgh School of Dentistry, and Dr. J. J. Enright, a research specialist of Mellon Institute. These contributions gave the first complete account of the results of the comprehensive scientific investigation of tooth decay or dental caries that has been in progress at the University of Pittsburgh during the past nine years.

In the reading and discussion of the papers by Drs. Friesell and Enright it was brought out that the new additions to dental knowledge resulting from this broad investigation were as follows: first, the determination of the effects of acids on tooth enamel under natural conditions; secondly, the discovery of the relation of the calcium phosphate content of the saliva to tooth decay; thirdly, the identification of the lactobacilli that cause tooth decay; and, fourthly, the description, in a preliminary way, of the results of a clinical study that demonstrated that an oral prophylactic program efficient in reducing the massive lactobacilli infection of the dental zone decreased by 66 per cent the amount of new tooth decay developing in a year.

# Inter-Chamber Health Conservation Contest \*

CHARLES W. GOLD

*Chairman of the United States Chamber of Commerce Health Conservation  
Contest Committee*

THIS closes the third year of the Inter-Chamber Health Conservation Contest which has been fostered and conserved by the Insurance Department of the United States Chamber of Commerce. Through the generosity of insurance companies it has been possible for representatives of the American Public Health Association to visit cities entered in the contest and discuss their community health programs. When the contest was started in 1929 it was announced that the purposes were two-fold: First, to acquaint citizens, particularly business men, with the work of their local health agency, and their communities' local health problems, with a view to bringing about improvements which would mean economic gain, for certainly community security and community comfort are real assets. Second, to provide an additional means for reducing preventable illness and untimely death. Each community must be measured eventually by the intelligent effort which it makes for a solution of these problems. While results of the contest with respect to the second purpose cannot yet be fully measured, yet insurance statistics show that there is an improvement in mortality from preventable diseases, and this of course is a factor in carrying out the first objective.

Among the many general collateral benefits resulting from the contest we find first, dissemination of general information on public health; second, the coördination of the work of local health agencies, thereby tending to eliminate overlapping activities and to stimulate concerted efforts on local health needs; and third, the keeping of records in better form and so that they are comparable with those of other communities. In addition to those general results there are also in many instances specific local accomplishments conferring immediate and lasting benefits on the community. While the Health Contest is not claimed to have been the only factor in making such accomplish-

\* Presentation of Awards to the winning cities in the 1930 Health Conservation Contest at the Annual Meeting of the Chamber of Commerce of the United States at San Francisco, Calif., May 20, 1932.

ments possible, it has provided the occasion for doing those things which previously were being considered and which lacked the influence and propelling force supplied by the Chamber of Commerce Health Committee.

Leading examples of recent improvements in public health, in the effectuation of which numerous local chambers of commerce have had a definite part, include: measures for improvement of milk supply; initiation of diphtheria immunization programs; periodic health examinations; surveys of public health activities; sanitary improvements; and medical examination of school children. Among other definite activities are those bringing about better coöperation between local practising physicians and health agencies, the establishment of many health services to include rural and urban districts. Such specific advances as new sanitary codes, movements for malaria control, new tuberculosis sanatoriums, etc., are but yard-sticks by which to measure the general advance.

The illustrations just mentioned indicate that chambers of commerce recognize the improvement of their communities' public health as a matter of interest to citizens. Let it be understood that the chambers in no way are interested in usurping the activities being carried on by their local health agencies. They are acting as coöperating bodies which make possible definite accomplishments which would be difficult or well nigh impossible for the local health agencies if left alone. The health activities being carried on by local chambers as they participate in the Inter-Chamber Health Conservation Contest are sometimes hard to measure in a tangible way; nevertheless, business and industry are coming to recognize more and more the fact that improvements in public health do produce economic gains.

The 1931 Contest has been the most successful of any of the contests during the 3 years of their existence. An increase in 1931 of more than 27 per cent in enrollment over that for 1930, 265 cities located in 45 states, the District of Columbia, and Hawaii, being represented, shows real progress. It is noteworthy that, even though the requirements in 1931 for a full score were made considerably more exacting, more than 70 per cent of the cities in the Contest for both 1930 and 1931 made higher scores for the latter than for the former year—and if allowance is made for the higher requirements there would be more than 90 per cent of these cities with higher scores in 1931.

The Board of Judges in rating the various cities in the 1931 Contest for the 6 population groups named a winning city, with 5 others

in each group being given honorable mention. An exception is that in Group V, 6 honor cities were named. These 37 award cities were located in all parts of the country. The State of New York led with a total of 6, California and New Jersey coming next in order with 5 each, followed by Wisconsin with 4, and Illinois with 2 winning cities.

As a Director of Insurance of your National Chamber of Commerce and as chairman of your departmental committee of insurance, may I be permitted to urge that each local chamber of commerce take a special interest in this health conservation work. We are asking for a closer tie-up between the city and county health departments and the local chamber, the idea being that this Inter-Chamber Health Contest will bring a standardization of requirements as to health facilities.

It is now a pleasure to give you the names of winning and honor cities in each of the population groups and, to the winner in each group, present a plaque in recognition of its activities and achievements in health conservation. In passing, may I, however, state that among those cities designated as leaders, in many instances the difference in score was very slight, as was also the margin of score for some of the honor cities over those standing immediately next to them. To the honor cities engraved certificates have been sent.

*In population Group I*—cities more than 500,000 population—the following, according to alphabetical order, are the award cities:

Baltimore, Md.	Philadelphia, Pa.
Detroit, Mich.	Pittsburgh, Pa.
Milwaukee, Wis.	St. Louis, Mo.

Milwaukee, which won in 1929, is again the winner in 1931.

*Of Group II cities*—between 250,000 and 500,000 population—the following are award cities:

Cincinnati, O.	Newark, N. J.
Kansas City, Mo.	Rochester, N. Y.
Minneapolis, Minn.	Toledo, O.

Rochester, for the past 2 years has been an honor city and now it stands first.

*Cities in Group III*—100,000 to 250,000 population—showed the following award cities:

Grand Rapids, Mich.	Syracuse, N. Y.
Hartford, Conn.	Utica, N. Y.
New Haven, Conn.	Yonkers, N. Y.

Group III is the only group in which a city has been a winner for 2 successive years. New Haven stands in first place.

*Award cities in Group IV*—50,000 to 100,000 population—are as follows:

East Orange, N. J.  
Evanston, Ill.  
Harrisburg, Pa.

Kenosha, Wis.  
Pasadena, Calif.  
Racine, Wis.

In this group we find Evanston one of the 2 winning cities from the State of Illinois, as the leader.

*Group V*—cities between 20,000 and 50,000 population—showed the following in the award group:

Alhambra, Calif.  
Brookline, Mass.  
Maplewood, N. J.  
Newburgh, N. Y.

Orange, N. J.  
Watertown, N. Y.  
West Orange, N. J.

Brookline, Mass., participated in the 1931 Health Contest for the first time and was the winning city in its group.

*Group VI cities* in the Contest included all those under 20,000 population. The award cities were as follows:

Chestertown, Md.  
La Salle, Ill.  
Lodi, Calif.

Monrovia, Calif.  
Palo Alto, Calif.  
Shorewood, Wis.

In this group, another Illinois city, La Salle, is the first award city. La Salle during the first 2 years of the Contest was also an honor city. Efforts each year have rewarded it with first place in 1931.

# EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

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## THE WESTERN BRANCH MEETING

THE third annual meeting of the Western Branch of the American Public Health Association was held June 9, 10 and 11, with headquarters at the Brown Palace Hotel, Denver, Colo. The meeting was well attended, with a registration of 230. There was an excellent selection of papers on practically every phase of public health. Naturally many of these referred to conditions which are particularly prominent in our western states, and along the Pacific Coast, though all of them were interesting from the public health standpoint, and many of them had a country-wide bearing. There is no question that the growth of the Western Branch in the three years of its existence has been phenomenal, and that it is playing a dominant part in the direction of public health opinion in the West as well as its expression in print and its carrying out in practice.

There was but one observable drawback to the meeting; namely, the absence of men from the East, a number of whom were on the program, but prevented from coming for one reason or another, largely on account of the depression, including the expense of travel and absence from office work.

A feature of the meeting was a garden party given by that dean of tuberculosis workers, Dr. Henry Sewall, and his charming wife. All



those in attendance at the Western Branch meeting as well as those who had attended the meeting of the National Tuberculosis Association in Colorado Springs, which immediately preceded, were invited, and many enjoyed the privilege of meeting Dr. and Mrs. Sewall as well as partaking of their gracious hospitality. Both Colorado Springs and Denver were at their best. There was still a good deal of snow on the mountains, and nature did all she could to make things entrancing.

The meeting of the National Tuberculosis Association was unexpectedly well attended, the registration being so large (550) that the programs ran short. Again, however, there was a notable absence of members and delegates from the eastern states. On Tuesday, June 7, a joint meeting with the Colorado State Society was held at the Broadmore Hotel and a dinner, attended by more than 300, was given in honor of the 50th Anniversary of the discovery of the tubercle bacillus by Robert Koch. Both meetings were most enjoyable. The people in both cities were hospitable to the last degree, and it is safe to say that all who had the good fortune to be present carried away delightful memories in addition to the scientific knowledge acquired from the reading of papers.

#### CHARLES V. CHAPIN, M.D.

THE resignation of Dr. Charles V. Chapin as Health Officer of the City of Providence, R. I., after 48 years of service, calls for more than passing notice. With no disrespect to anyone, it may be said without any fear of contradiction that Dr. Chapin has occupied for many years the position of Dean of City Health Officers.

During his service he introduced many new practices, the most important perhaps being the doing away with terminal disinfection. After a series of careful experiments, with and without terminal disinfection, he decided that it was an expense which was not justified. Since that time many cities have followed his lead. While he was not a prolific writer, his book, *The Sources and Modes of Infection*, has been for many years a standard.

Dr. Chapin could have had any honor which he desired, but with a sincere and unusual modesty he combined a rather frail physical make-up, so that many were declined. He could have been President of the American Public Health Association at any time he cared to signify his willingness to accept the honor. Finally in 1927 he was persuaded to do so, and the Association felt itself honored in having

him serve. He was the first recipient of the Sedgwick Memorial Medal and no committee ever made a selection which received more unanimous approval than this. One of the last honors done him was a resolution adopted in December, 1931, just when he was about to relinquish his office, changing the name of the Providence City Hospital to the Charles V. Chapin Hospital.

It is not flattery to make the statement that there is no member of our Association who for so many years has retained the admiration, respect, and affection of its membership. We wish him all happiness in his quiet home with Mrs. Chapin who, as all of us remember, came with him regularly to the meetings of the Association which he was able to attend.

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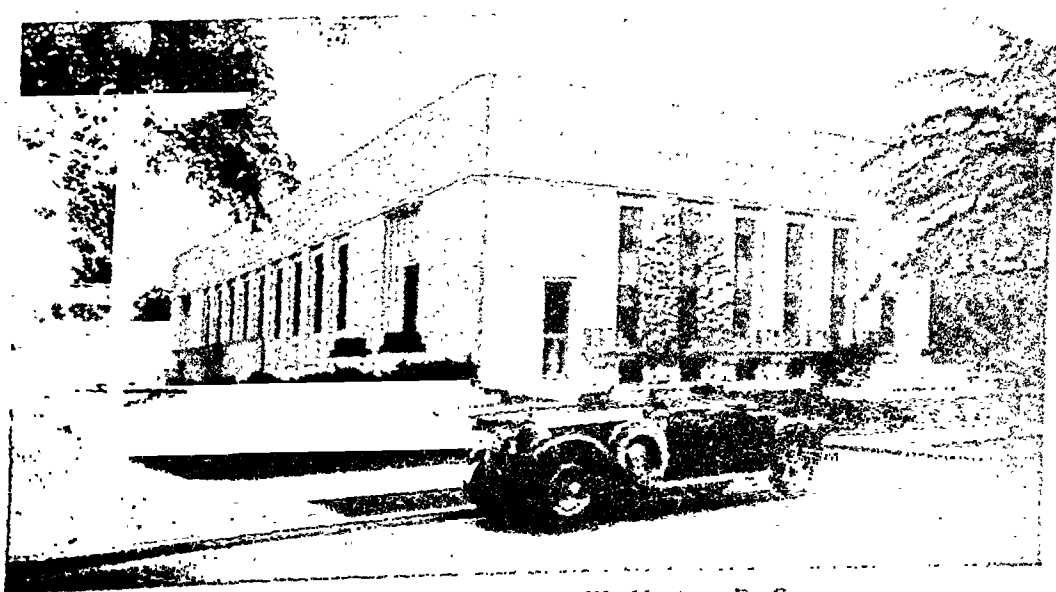
## THE FOLGER SHAKESPEARE LIBRARY

CURTIS HODGES

*Executive Director, Greater National Capital Committee,  
Washington, D. C.*

A NEW attraction in Washington, and one that is drawing literally thousands of visitors each week, is the Folger Shakespeare Library, unexcelled for the architectural beauty of its build-

ing and its rare collection of Shakespeareana. It is a 10-million-dollar institution made possible by the beneficence of Henry Clay Folger, prominent business executive who devoted large



*Folger Shakespeare Library, Washington, D. C.*

sums of money and many years of personal effort to its perfection.

Through more than five decades, Mr. Folger day by day and month by month accumulated the most valuable and use-

gant praise. The words of Walter Prichard Eaton, essayist and critic, pronounced on the day of the dedication are peculiarly apt:

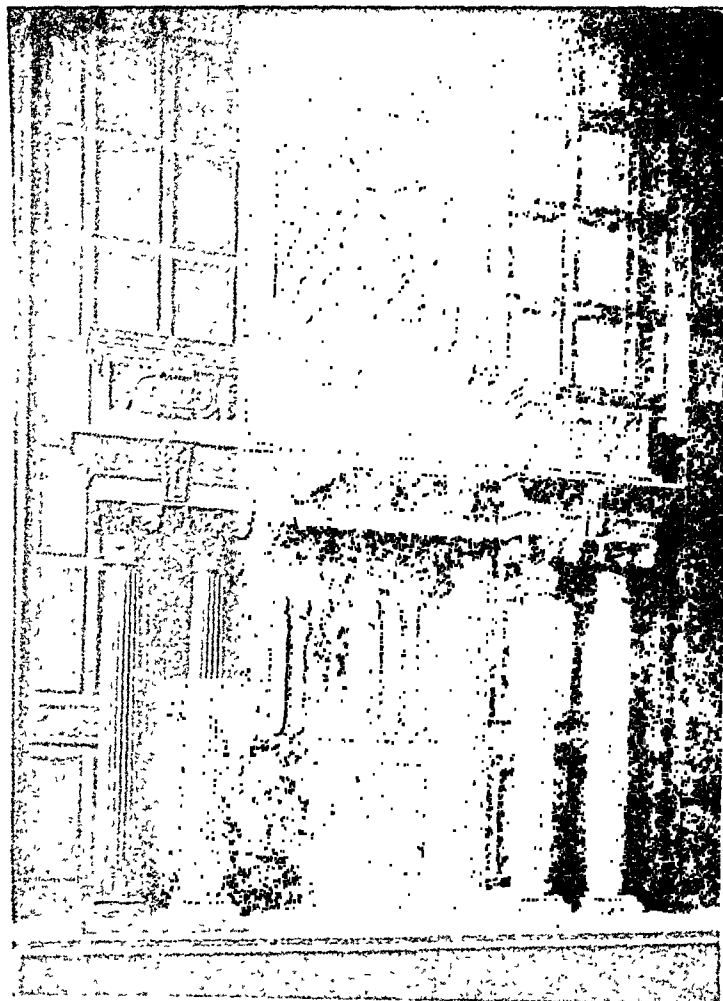
"All scholars will rejoice that the Folger collection is made available and it should be a matter of pride to all of us that the library which houses it is in the National Capital, marking one more step in the development of that city, not only toward a place of civic beauty but of intellectual wealth."

The Folger Library is situated on East Capitol Street between Second and Third Streets, the site having been selected personally by Mr. and Mrs. Folger. To build the library there, it was necessary to raze 14 houses, and the procedure of obtaining titles to these buildings required 9 years. Alexander B. Trowbridge was the consulting and supervising architect and Paul P. Cret was the architect.

The building is of glistening white marble and is noted for its simplicity in design. In size, it is not comparable to the other large buildings of Washington, but it has a distinctive charm.

"I did think of placing the Shakespeare Library at Stratford near the bones of the great man himself but I finally concluded I would give it to Washington; for I am an American." These were the words of Mr. Folger.

And as a result of Mr. Folger's imagination, his ability, and his loyal American spirit, the people of this nation have a new shrine in their national city.



*Entrance to Exhibition Hall  
Folger Shakespeare Library*

ful mementos of Shakespeare to be found on both sides of the world, and this vast collection is now housed in the new snow-white building directly across from the Congressional Library. This noble structure in its carefully cultivated lawn and with its marvelous and dignified shrubbery, takes a high place among the worthwhile sights of Washington.

Its dedication on Saturday, April 23, was attended by dignitaries, savants, and leading men from all walks of life, and all gave the new institution extrava-

## LETTER FROM GREAT BRITAIN

### A PIONEER IN FACTORY HYGIENE

BY the death of Sir Thomas Legge, preventive medicine has lost one who in his day was responsible for many contributions of real value, in the realm of industrial hygiene especially.

During the years he acted as Senior Medical Inspector of Factories at the Home Office, a position he succeeded to on the retirement of Sir Arthur Whitelegge, he sought in every way possible to secure healthy conditions for the industrial worker. Particularly he sought to have introduced every available measure that research and experience showed to be essential as a protection to health and a preventive of injury or disease. In these regards he endeavored to promote coöperation between all parties concerned, including employers and employees, and he was all for placing the main control in the hands of the Factory Department.

Actually he had little use for local health authorities, and one of his strongest convictions was that the less the medical officer of health was given to do with factories and the health of the factory worker the better it would be for everybody.

The absence of direct relation between the Factory Department and the Ministry of Health was an arrangement of which he entirely approved. He rarely missed an opportunity, either before or after his retirement from office, of saying so. Nor did he hesitate to assert that industrial hygiene and trade diseases and poisonings were matters so definitely for the specialist that no ordinary medical practitioner should be allowed to give even the most elementary addresses upon them to a

popular audience. This rather uncompromising attitude of mind was typical of the man and was responsible for his resignation of his post of Senior Medical Inspector, the ground being that certain regulations issued by the Home Office with regard to the prohibition of the use of white lead for the internal painting of buildings did not go so far as he believed they should, having regard to the recommendations of the 1921 International Convention at Geneva.

After his retirement Sir Thomas Legge continued to take a great interest in industrial affairs, associating himself with the work of the Trades Union Congress, the Industrial Health Education Society and other bodies.

He was extremely keen on teaching and made himself responsible for some part of the instruction given to students on industrial hygiene and diseases at the London School of Hygiene. This work will now be carried on by Dr. Middleton of the Factory Department, who, among other matters, has devoted a great deal of time and study to the subject of pulmonary silicosis.

### CUTS IN THE HEALTH SERVICES

UP to the present, as a result of the economic situation, the amount of interference with health activities, national and local, has been comparatively slight. Indications that this state of affairs is not likely to continue appear from time to time, however, in the public statements of members of the Government and otherwise.

The Minister of Health himself rather unexpectedly, since it is not so long ago that he pointed with some pride to the

smallness of the cuts in health expenditure, recently made a strong appeal to all local authorities to adopt as a policy the postponing of all forms of capital expenditure not essential for the public health or in relation to any other question of general public necessity. Giving it as his opinion that things had been placed on lines that would lead to prosperity, he still thought that the proper course was to restrain public expenditure wherever with safety it could be restrained, in order to increase the funds available under the control of private enterprise for the restoration and expansion of the essential industries of the country.

The view that there are vast possibilities of saving by way of cuts in social services appears to be widely held, particularly by the newer and younger members of Parliament. The big changes that took place in the personnel of Parliament following the recent election have been responsible for a number of happenings that must have caused distress and annoyance to persons accustomed to a more or less uniform procedure no matter what party happened to be in power.

So many of the new people are young and in a hurry that, without troubling to learn or thinking of consequences, they dash at things and make demands that to the old fashioned appear outrageous. More especially many of the newer and younger people are a little inclined to regard Parliament and the central governing body as a great deal more powerful and superior to the local bodies than is actually the case. Public health, for example, always regarded as much more of a local than a central concern, has been more definitely so regarded since the passing of the Local Government Act, 1929; and, even if it could, Parliament directly or through the government departments interferes very little. This many of the newcomers

to Parliament apparently do not know. If they did they probably would not, as some have done, talk about restrictions upon the freedom of action of local authorities in carrying out statutory duties, and thus run the risk of rousing the resentment of these authorities, even in the interests of what they describe as "public economy."

Doubtless savings could be effected if duties were limited or restrictions were imposed; but so they could if restrictions were removed in certain cases. Annually, for example, large sums must be spent by local authorities on housing and slum clearance, and if something could be done to reduce expenditure in this direction the public purse might, though the public health might not, benefit.

#### LONDON'S WATER IN 1931

THIS is the season when annual reports begin to make their appearance. One of the most interesting just come to hand is that of Sir Alexander Houston, Director of Water Examination to the Metropolitan Water Board.

Issued primarily to give the results of the chemical and bacteriological examination of the London waters for the previous 12 months, during recent years, at any rate, these reports of Houston's have provided him with an opportunity of singing songs in praise of the beauty of the rivers Thames and Lee from which the metropolis obtains the bulk of her water supply. In general also the descriptions are illustrated with most attractive photographs and extracts from the poetry and prose writing lovers of the river.

Even in the more technical portions of his report Sir Alexander is unable to resist digression, and a reference to a search for the *Bacillus typhosus* in some particular sample is as likely as not to lead him into a discussion of and an ex-

pression of view upon some historic epidemic of enteric.

The report for the year 1931, although "owing to financial considerations" its scope had to be greatly curtailed, presents all the familiar features, the practical and technical being lightened by much talk of the County of Essex, and a description of a journey through Epping Forest to Epping, where an outbreak of paratyphoid fever occurred in the early part of 1931. Having found that this was due to contaminated milk and not to the water for which he is responsible, Sir Alexander devotes a number of pages to a discussion of the advantages of the

pasteurization process as applied to milk. Also he expresses astonishment at the lowness of the bacterial standards prescribed in the case of milk, and as regards purity compares that liquid most unfavorably with that with which he himself is more intimately concerned.

A report of water examinations could, I imagine, be an immensely dull production. In the hands of Sir Alexander Houston it becomes, both to the expert and the general reader, worth the price—approximately \$2.00—at which it is offered.

CHARLES PORTER, M.D.

London

## ASSOCIATION NEWS

*Sixty-first Annual Meeting of the A.P.H.A.  
Washington, D. C., October 24-27, 1932  
Headquarters, Willard Hotel*

### ANNUAL MEETING INFORMATION

#### REDUCED RAILROAD FARES

**R**EDUCED railroad fares on the Identification Certificate Plan have been authorized by the several Passenger Associations in the United States and Canada, which will entitle all members and dependent members of their families to a special rate of a fare and one-half for the round trip to Washington.

Under this plan an Identification Certificate *must be presented* to the ticket agent when purchasing tickets. (One will be mailed to every member of the Association about September 10.)

This is the ticket agent's authority to issue to delegates and dependent members of their families a round-trip ticket to Washington at the reduced rate. All return tickets must be validated, before leaving Washington, at the regular railroad ticket office.

It is suggested that all members consult their local ticket agents in regard to dates of sale as they vary according to distance from Washington.

The final return limit is 30 days in addition to date of sale. Delegates may travel to and from Washington via the same route or via diverse routes, as they prefer, without additional cost.

## RAILROAD RATES FROM VARIOUS CENTERS TO WASHINGTON, D. C.

	Regular Rate One-Way	Special Rate Round Trip <i>Fare-and-a-Half</i> Basis		Lower Berth One-Way	Upper Berth One-Way
Atlanta, Ga.....	\$22.97	\$34.46		\$7.50	\$6.00
Baltimore, Md.....	1.44	2.16	Seat, .75		
Boston, Mass.....	16.40	24.60	Seat, 3.38	5.63	4.50
Buffalo, N. Y.....	15.71	23.57		4.50	3.60
Chicago, Ill.....	27.78	41.67		8.25	6.60
Cincinnati, O.....	20.15	30.23		5.63	4.50
Cleveland, O.....	15.63	23.45		4.50	3.60
Dallas, Tex.....	50.42	75.63		15.38	12.30
Denver, Colo.....	65.06	97.59		18.00	14.40
Detroit, Mich.....	21.55	32.33		6.38	5.10
Duluth, Minn. (via Chicago).....	44.19	66.29		12.75	10.20
Fort Worth, Tex.....	51.56	77.34		15.38	12.30
Indianapolis, Ind.....	24.10	36.15		7.50	6.00
Jacksonville, Fla.....	28.41	42.62		8.63	6.90
Kansas City, Mo.....	42.58	63.87		12.00	9.60
Los Angeles, Calif.....	103.07	154.61		31.50	25.20
Louisville, Ky.....	23.72	35.58		7.50	6.00
Memphis, Tenn.....	33.57	50.36		10.13	8.10
Minneapolis, Minn.....	42.44	63.66		12.00	9.60
Montreal, Que., Canada.....	22.15	33.23		6.38	5.10
Nashville, Tenn.....	26.61	39.92		9.00	7.20
New Orleans, La.....	40.20	60.30		12.00	9.60
New York, N. Y.....	8.14	12.21	Seat, 1.88	3.75	3.00
Omaha, Neb.....	45.71	68.57		12.75	10.20
Philadelphia, Pa.....	4.90	7.35	Seat, 1.13	3.01	2.41
Pittsburgh, Pa.....	10.90	16.35	Seat, 2.25	3.75	3.00
Portland, Ore.....	104.99	157.49		31.50	25.20
Salt Lake City, Utah.....	82.85	124.28		23.63	18.90
San Francisco, Calif.....	103.07	154.61		31.50	25.20
Seattle, Wash.....	104.99	157.49		31.50	25.20
St. Louis, Mo.....	32.54	48.81		9.00	7.20
Brandon, Man., Canada.....	61.14	91.71		16.50	13.20
Calgary, Alb., Canada.....	82.85	124.28		24.75	19.80
Charlottetown, Pr. E. I., Canada..	40.25	60.38		10.50	8.40
Fredericton, N. B., Canada.....	32.50	48.75		10.13	8.10
Hamilton, Ont., Canada.....	18.03	27.05		5.63	4.50
Harbor Grace, Newfoundland.....	71.85	107.76		15.25	12.20
Halifax, N. S., Canada.....	42.05	63.08		13.88	11.10
Juneau, Alaska.....	124.24	186.30		31.88	25.50
Kenora, Ont., Canada.....	46.78	70.17		15.63	12.50
Kentville, N. S., Canada.....	43.31	64.97		10.50	8.40
Ottawa, Ont., Canada.....	25.80	38.70		7.88	6.30
Port Arthur, Ont., Canada.....	46.78	70.17		12.83	10.25
Quebec, Que., Canada.....	27.77	41.66		8.25	6.60
Saskatoon, Sask., Canada.....	73.85	110.76		21.75	17.40
St. John, N. B., Canada.....	33.35	50.03		10.50	8.40
Toronto, Ont., Canada.....	19.38	29.07		5.63	4.50
Three Rivers, Que., Canada.....	26.82	40.23		8.25	6.60
Vancouver, B. C., Canada.....	101.99	157.49		31.88	25.50
Winnipeg, Man., Canada.....	57.60	86.40		16.50	13.20

## WASHINGTON HOTEL RATES

Hotel	Room Capacity	Single Room		Double Room	
		Without Bath	With Bath	Without Bath	With Bath
Ambassador . . . . .	500	\$2.50	\$3.00-\$4.00	\$4.00	\$5.00 \$6.00
Annapolis . . . . .	400	....	2.50- 4.00	....	4.50- 6.00
Blackstone . . . . .	100	....	3.00- 3.50	....	5.00- 6.00
Burlington . . . . .	200	3.00	2.50- 3.00	3.00	3.50- 4.50
Cairo . . . . .		2.00- 2.50	2.50- 3.00	2.50- 3.50	4.00- 5.00
Capital Park . . . . .	150	2.00	2.50- 3.00	3.00	4.00 6.00
Carlton . . . . .	400	....	4.00- 7.00	....	6.00 10.00
Commodore . . . . .	150	2.00	2.50- 3.00	3.00	4.00 5.00
Continental . . . . .	250	2.00	2.50	3.00	4.00
Dodge . . . . .	250	2.50- 3.00	3.00- 5.00	4.00	5.00- 8.00
Driscoll . . . . .	200	2.00	3.00	3.00	5.00
Ebbitt . . . . .		....	2.00- 3.00	....	3.00- 5.00
Francis Scott Key Apartments . . . . .	100	....	2.50	....	3.50- 5.00
Hamilton . . . . .	300	2.50	3.00- 3.50	4.00	5.00- 6.00
Harrington . . . . .	200	2.00	2.50- 3.50	3.00	3.50- 6.00
Hay-Adams . . . . .	200	....	4.00- 6.00	....	6.00 10.00
Lafayette . . . . .		....	3.00- 8.00	....	5.00 12.00
Lee House . . . . .	250	....	3.00	....	5.00
Martinique . . . . .	175	....	3.00- 5.00	....	5.00 7.00
Mayflower . . . . .		....	4.00- 9.00	....	6.00-12.00
Metropolitan . . . . .	400	1.50- 2.00	2.50- 3.00	2.50 3.00	4.00- 5.00
New Colonial . . . . .	200	....	3.00- 3.50	....	4.00- 5.00
Parkside . . . . .	100	....	3.00	....	4.00
Plaza . . . . .	80	2.00- 3.00	2.50- 3.50	3.00 4.00	3.50 6.00
Powhatan . . . . .	300	....	3.00- 3.50	....	4.00- 8.00
Raleigh . . . . .	1,000	2.50	3.00- 5.00	3.50	4.50- 9.00
Roosevelt . . . . .	250	....	2.50- 3.50	....	4.00- 6.00
Shoreham . . . . .		....	4.00	....	6.00
Wardman . . . . .	500	....	4.00	....	6.00
Washington . . . . .		....	4.00- 5.00	....	6.00- 8.00
Willard . . . . .		....	3.50- 4.00	....	6.00- 7.00
Willard . . . . .		....	3.00	4.00	5.00
Winston . . . . .	200	2.00			
Young Men's Christian Assn. . . . .		1.00- 1.50		2.00	
Young Women's Christian Assn. . . . .	55	1.00		3.00	

NOTE: See page 741 for Hotel Reservation Blank.

## COMMITTEE ON TRAINING AND PERSONNEL

The Committee on Training and Personnel, with the approval of the Executive Board, has adopted the following general plan for the registration of Health Officers. It is arranged:

1. That during the year 1932 the American Public Health Association register all full-time executive officers of health departments who seek registration according to the plan organized by the Committee on Training and Personnel.

2. That the names and data concerning these individuals be published in alphabetical order in a directory.

3. That there be included for registration persons who served as full-time executive officers for not less than 2 years and who have not been out of the public health field for more than 2 years and who seek registration according to the plan organized by the Committee on Training and Personnel.

4. That some plan be devised whereby individuals may be registered in the future



through an examination given under suitable auspices whereby they can demonstrate a satisfactory knowledge in specified subjects.

5. That the Committee on Training and Personnel and the executive office undertake an educational program to secure support from public organizations for the program of the Committee on Training and Personnel looking to the improvement of tenure and training for public health workers.

6. That the sub-committee uphold and approve the general principle of legal licensing of executive officers in public health.

Registration is not restricted to members of the Association. However, as in other professional directories (like the A.M.A.) names of members in the Association will be printed in large type.

Registration was begun several days

ago when blanks were sent to 772 full-time state, county, and city health officers. We are, however, finding it difficult to reach those who have served as full-time executive officers for not less than 2 years and who have not been out of the public health field for more than 2 years or are, at the present time, engaged in some other phase of public health work. If you belong to either of these groups and wish to register will you kindly secure a registration blank from the Committee on Training and Personnel, American Public Health Association, 450 Seventh Avenue, New York, N. Y.

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

### *Health Officers Section*

H. M. Batson, M.D., Cadiz, Ky., Director,  
Trigg County Health Dept.  
William D. Cagle, M.D., Lebanon, Tenn.,  
Director, Wilson County Health Unit  
W. R. Culbertson, M.D., Norton, Va., Wise  
County Health Officer  
John B. Derrickson, M.D., Georgetown, Del.,  
Unit Health Director  
Charles H. Eller, M.D., Box 2, Los Lunas,  
N. M., Valencia County Health Officer  
Joseph J. Gerkins, M.D., Pikeville, Ky.,  
Director, Pike County Health Unit  
Thomas N. Horan, M.D., Bloomfield Hills,  
Mich., Health Officer  
Arden J. Butler, M.D., Covington, Tenn., Tip-  
ton County Health Director  
I. N. King, M.D., Prince Frederick, Md.,  
Calvert County Health Officer  
Reuben H. Leavitt, M.D., Carson, N. D.,  
County Health Officer  
Dr. James M. Parrott, Raleigh, N. C., State  
Health Officer  
Guy Post, M.D., White Cloud, Mich., Director,  
Newaygo District Health Unit  
W. H. Y. Smith, M.D., Perry, Fla., Director,  
Taylor County Health Unit  
George H. Spelman, Mandan, N. D., City  
Health Commissioner  
J. Syrnington, M.D., Carthage, N. C., Moore  
County Health Officer

H. M. Wallace, M.D., Staunton, Va., Augusta  
County Health Dept.

### *Laboratory Section*

Victor W. Bergstrom, M.D., 21 Park Ave.,  
Binghamton, N. Y., Director, Kilmer  
Pathological Laboratory

### *Public Health Engineering Section*

Elmore E. Butterfield, M.D., 70-04 Dartmouth  
St., Forest Hills, N. Y., Consulting Chemist  
Harry E. Jordan, 113 Monument Circle,  
Indianapolis, Ind., Filtration Engineer,  
Indianapolis Water Company  
Dick C. Thompson, Nashville, Tenn., Davidson  
County Sanitary Engineer  
J. Summie Whitener, P. O. Box 5171, Raleigh,  
N. C., Assoc. Professor of Sanitary Engineer-  
ing, North Carolina State College

### *Food and Nutrition Section*

Julius H. Comroe, 353 S. George St., York,  
Pa. (Assoc.)

### *Child Hygiene Section*

William H. Griffin, D.M.D., 1108 City Hall  
Annex, Boston, Mass., Dental Director,  
Dept. of Health  
Mabel E. Rugen, Ph.D., Barbour Gymnasium,  
Ann Arbor, Mich., Instructor of College  
Classes

James J. Siragusa, M.D., 261 Hanover St., Boston, Mass., Medical Inspector, Dept. of Health

Luigi P. Verde, 699 Adams St., Dorchester, Mass., Medical Inspector, Boston Dept. of Health

## Public Health Education Section

Rexwald Brown, M.D., 1421 State St., Santa Barbara, Calif., Director, Santa Barbara Clinic

Alexander M. Carr, Washington Square Building, Royal Oak, Mich., Pediatrician

Marcos Fernan-Nunez, M.D., 1848 N. 4th St., Milwaukee, Wis., Director, Dept. of Pathology and Bacteriology, Marquette University Medical School

Earl E. Kleinschmidt, M.D., 119 N. Thayer St., Ann Arbor, Mich., Instructor in Public Health and Hygiene, University of Michigan

Elizabeth P. Robinson, University Health Service, Ann Arbor, Mich., Supervising Nurse and Instructor of Hygiene and Public Health

Dr. Georg Seiring, Deutsches Hygiene Museum, Dresden, Germany (Assoc.)

Robert E. Wodehouse, M.D., 304 Plaza Bldg., Ottawa, Ont., Canada, Executive Secretary, Canadian Tuberculosis Association

## Public Health Nursing Section

Maud A. Conkling, R.N., Yorktown Heights, N. Y., School Nurse

Bertha Knipfer, 614 Robert E. Lee Apt., Nashville, Tenn., Davidson County Field Nurse

Bessie H. Morse, Covington, Tenn., Tipton County Nurse

Gladys M. Piper, R.N., 416 Carolina Ave., Bristol, Tenn., Chief Nurse, Sullivan County Health Dept.

Margaret B. S. Schinz, R.N., 1144 Henry Clay St., Milwaukee, Wis., Village Nurse, Whitefish Bay

Sarah Smith, R.N., Manderson, S. D., Nurse, Indian Service

Beulah White, R.N., Ashdown, Ark., Public Health Nurse

Louise Zorn, R.N., Court House, Kelso, Wash., Cowlitz County Nurse

## Epidemiology Section

Harlin L. Wynns, M.D., 358 State Building, San Francisco, Calif., Junior Epidemiologist, State Dept. of Health

## Unaffiliated

William D. Rankin, M.D., 51 E. 50 St., New York, N. Y. (Assoc.)

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## HOTEL RESERVATION BLANK FOR WASHINGTON MEETING

### AMERICAN PUBLIC HEALTH ASSOCIATION

450 SEVENTH AVENUE, NEW YORK, N. Y.

OCTOBER 24-27, 1932

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# PUBLIC HEALTH ADMINISTRATION

Racine, Wis.—The new quarters of the health department provide adequate space and proper facilities for carrying on a well rounded health program. Community Health Day, with a special demonstration, marked the opening of these new quarters.

A general health education program has been developed. A monthly bulletin, special health lectures, newspaper and magazine articles, and special folders on smallpox vaccination and diphtheria immunization were utilized. A unique feature was the development of dramatic health episodes broadcast three times weekly over station WRJN.

The crude death rate was 9.04. Stillbirths and infant mortality rates were respectively 32.2 and 36.2. Heart disease heads the list of all causes of death with a rate of 198, but 73 per cent of all deaths occurred after the age of 60. There was a decrease in deaths due to cancer, the rate being 117.

There was 1 case of smallpox during the year, and 1,682 individuals, mainly children, were vaccinated. Diphtheria cases numbered 19, 3 of which were fatal. Children who were immunized numbered 1,866. Scarlet fever presented a real problem with 211 cases and 9 deaths. There were 658 cases of measles and German measles, with no fatalities. Chicken pox and mumps numbered 479 and 536 cases respectively, with no deaths.

During the year, 241 cases of communicable disease were hospitalized at the Lincoln Hospital. Of these, scarlet fever numbered 132. There was a total of 5,968 patient days.

Medical calls on contagious disease cases totaled 1,907, and physical examinations of preschool and school children

numbered 4,500. Six hundred and fifty-six children were cared for at the dental clinic. A total of 1,663 visits were recorded at the venereal disease clinic, 105 patients receiving treatment.

The nursing division made a total of 9,280 home visits in the control of communicable disease, and tuberculosis visits totaled 2,077. Thirty-one hundred and ninety-six preschool children were served during the year, and 89,320 services rendered by nurses in the schools.

The laboratory examined 8,229 specimens, of which 1,697 were for diphtheria and 924 for tuberculosis. Besides routine examinations, work was begun on the culturing of scarlet fever cases in relation to release.—*An. Rep.*, Health Dept., Racine, Wis., 1931.

Ottawa, Canada—This city with a population of 130,672 in 1931 reports a birth rate of 23.4 and a death rate of 11.2. There were 11 deaths due to diphtheria as compared with 26 in 1930. An educational campaign for diphtheria prevention by toxoid immunization was carried on during the year. Posters were used in store windows and street cars, advertisements were used in newspapers, and literature was distributed to parents by nurses and through schools, and by lectures by the medical officer of health and the school physician.

Three toxoid clinics were conducted by the health department, and a fourth by a physician and the Victorian Order of Nurses. These clinics secured the immunization of 1,500 children during the year and stimulated an increase in the numbers applying to their family physicians for protective treatment.—*An. Rep.*, Medical Officer of Health, Ottawa, 1931.

**Honolulu, Hawaii**—In this city of 137,582 population, Palama Health and Welfare Center rendered important services in 1931. There were 44,616 visits to clinics, including 203 visits to the Mother's Health Clinic opened in July. There were 1,425 X-ray examinations for the Board of Health, and 623 others for junior high school pupils and other clinic cases. An excellent coöperative program has been developed with the support of the Medical Society. There were 37,605 home visits made by 17 public health nurses in behalf of tuberculosis, prenatal, child hygiene, and other cases. Child health conferences (15 weekly and 2 bi-weekly) are conducted jointly by the Palama nurses and doctors, and the Board of Health nurses. An active recreation program is also conducted. A newly organized tuberculosis committee, from August 1 to December 31, reached some 11,000 individuals through health education channels, besides 14,236 persons reached through the Christmas Seal Sale.—Palama Settlement, *Stat. Rep.*, 1931.

**Saving Eyes**—An excellent example of an attractive, well printed, and enlightening annual report is that of the National Society for the Prevention of Blindness. That progress is being made against ophthalmia neonatorum is suggested in the fact that in 1931 only 7.5 per cent of all new admissions to schools for the blind were victims of this disease, while in 1907 the figure was 28 per cent. Additional emphasis was placed upon eye tragedies resulting from inherited syphilis. During the year, the society gave 103 demonstrations of vision testing in 9 states and 42 cities, before 6,789 school and public health nurses, teachers, doctors, and social workers. In one state, 8,000 preschool children had their vision tested in accordance with the society methods and the results proved the importance of early eye examinations. Attention has been directed to the con-

servation of eyes of school children and aid has been given to the revision of the code for lighting school buildings. During the year, 22 additional sight-saving classes were organized, bringing the total number in the United States to 398, located in 23 states and 114 cities.—*Seventeenth An. Rep.*, National Society for the Prevention of Blindness, 1931.

**Knoxville, Tenn.**—The Health Officer calls attention to the fact that in 1924 there occurred in that city 296 cases of typhoid fever, resulting in 33 deaths and this was considered an average year. The economic loss resulting from this disease at that time amounted to 6.35 cents per capita. Early in 1925 an extensive program of sanitation was instituted which has cost the city about 10 cents per capita per year and has resulted in a reduction of 5.08 cents in the per capita cost of typhoid fever, such cost in 1931 amounting to only 1.27 cents. Thus the saving is ten times the yearly budget for all public health activities.

In 1931 the death rate in Knoxville was the lowest on record, 11.2 per 1,000 (excluding non-residents) and 12.6 was the crude rate. A comparison is afforded of the score of the health activities of this community over a period of years. In 1924 when the *Appraisal Form* was first utilized, Knoxville scored 351 points out of 1,000. By 1926, the score had increased to 610 and in 1931 the attainment was 697 points.

The Health Officer is to be commended for the excellency and simplicity of his annual report and the interesting charts which accompany the tables. A complete index makes the report of special value.—*An. Rep.*, Bureau of Health, Knoxville, Tennessee, 1931.

**Jerusalem**—The Straus (Hadassah) Health Center includes a program of health education, prenatal and infant welfare, nutrition, school hygiene, dental

hygiene, corrective gymnastics, child adjustment, and milk pasteurization supervision. Child guidance in the pre-school period is stressed. The center aims to be a place for testing forms and methods of health promotion in the widest sense, as well as for the application of methods which have stood the test. Education is the central motive.

In view of the lack of high grade milk for children, the center has equipped a modern pasteurization plant. For the first time in Palestine, as well as in the Near East, a high grade, inspected, bacteriologically controlled, pasteurized milk has been made available.

Because of the heterogeneity of the population, the center has found it necessary to experiment with methods of education. During the Pessach week in April, 1931, a graphic and pictorial exhibit was opened, presenting in colored posters, charts, and models, the essential facts of the modern knowledge of nutrition. "The vivid examples of right and wrong food and the consequences struck a convincing note in those who could not be easily influenced by language, written or spoken." The Health Center of Jerusalem is owned and maintained by Hadassah, the Women's Zionist Organization of America. It was made possible by a gift by Nathan and Lina Straus.—*First An. Rep.*, Straus Health Center, Jerusalem, 1931.

**Loose Milk**—"Is Loose Milk a Health Hazard?" Much valuable information regarding this question is contained in the report of the Milk Commission of the Department of Health of New York City. This commission, appointed at the request of the Commissioner of Health, was made up of eminent scientists and welfare workers. Loose milk is defined in the report as that portion of the city's Grade B milk

which is delivered in bulk. Nearly half of all the milk sold in New York is by this definition loose milk. Under this heading, of course, is included the large amount of milk used by institutions and for manufacture, but a large portion is used by restaurants, soda fountains and the like, to be dipped into glasses and served on the premises; and another class, representing about half of the bulk milk used, goes to retail groceries, delicatessen stores and similar establishments. These last two classes are particularly liable to contamination, and constitute the major part of the loose milk problem.

The commission, after extensive investigation, recommends that the sale of loose or dipped milk not consumed on the premises be prohibited, and that milk for consumption on the premises be dispensed only from bottles filled and sealed at the milk plant. However, in view of economic conditions, the restrictions are to be deferred until January, 1933, if the recommendations are adopted.

The Commission believes that the sale of loose milk represents a potential health hazard because of the greater opportunities for removal of cream or the addition of water, because the dipping method tends to give the first customers a disproportionate amount of the cream, and because the distribution by dipping from cans results in exposure to possible contamination.

All market milk should be protected by the additional safeguard of pasteurization, and thereafter kept in closed containers which are not opened until they reach the place at which the milk is to be consumed. . . . Even though the records of the health department disclose no cases of disease which have been traced definitely to the sale of loose milk, the commission believes, in view of the inferior quality, as shown by laboratory tests, and the greater chances of contamination, that loose milk is a potential health hazard.

# LABORATORY

## THE EFFECT OF VARIATIONS IN TEMPERATURE IN 37° C. INCUBATORS ON BACTERIAL COUNTS FROM MILK

ROBERT S. BREED, PH.D., F.A.P.H.A., AND CARL S. PEDERSON  
*New York Agricultural Experiment Station, Geneva, N. Y.*

DURING 1930-1931, the authors of this report, with the help of others,\* and with the coöperation of all of the important manufacturers of bacteriological incubators, made tests of commonly used bacteriological incubators. In the majority of cases, the incubators tested have been recent models loaned to us for test. While the results have been most disconcerting, they seem to open the way for a better standardization of bacteriological incubators for use in milk work that may do much toward solving some troublesome discrepancies. All milk control workers are familiar with cases where one laboratory almost continually reports agar plate counts higher or lower than some other laboratory that analyzes the same milk supply. Incubators apparently play an important part in causing discrepancies of this sort.

In the present studies, the bacteriological method of testing incubators first utilized by Supplee, Whiting and Downs† has been used and developed. They tested their incubator by pouring enough plates from the same sample of milk to fill the incubator. They then made counts from the plates, keeping a record of the position in the incubator of each plate and of such temperatures

as could be readily observed with the instruments at hand. After the publication of their bulletin, C. P. Olander of the Summe Dairy Company of Kansas City stirred our interest in the matter by sending us the record of a similar test of the bacteriological incubator that he was using. Both of these tests showed surprising discrepancies in counts due to the position of the plates in the incubator. The plates were heated too slowly in one incubator while they were overheated in the other.

The names of the incubators that were tested have not been given in the summary (Table I), partly because it was inconvenient, but chiefly because it was feared that the publication of these names without a more complete discussion than can be given here might leave false impressions.‡ If one incubator was listed as a No. 7 or as a No. 33 of some special type and our record showed that these incubators gave unsatisfactory results, a natural assumption would be that all incubators of the same make and number would give equally unsatisfactory results. It is not felt that such a conclusion would be justified for this assumes that the manufacturer has kept and will keep his models unchanged without improvements. From the interest shown by

\* Dr. M. O. Robinson of the Scott-Powell Dairies, Philadelphia, and Richard Eglinton of the Geneva City Department of Health, should receive especial mention for their valuable assistance.

† Cornell Univ. Agri. Exper. Sta., *Memoir 43*, 1921.

‡ For a more complete report. See the *Milk Plant Monthly*, 21:43 (Mar.), 1932; and the *Proc. 24th Ann. Convention, International Assn. Milk Dealers*, Laboratory Section, Oct., 1931.

manufacturers, some of whom have spent and will continue to spend much money in developing high class constant temperature apparatus, it is evident that the latter conclusion would be fallacious. Slight changes in the size or construction of incubators may make very noticeable differences in the results obtained.

Incubators of many commonly accepted types have been used in these tests, *i.e.*, water jacketed types made by the Wilmot Castle Co. and A. H. Thomas Co.; anhydric incubators made by the Freas Thermo-Electric Co., Chicago Surgical and Electric Company, Hearson Co., Electric Heat Control Apparatus Co.; and one home-made incubator. It was impossible to complete the tests of the DeKhotinsky and Lidberg models in time to incorporate the results in this preliminary report.

Only a few general statements can be made about results. In the first place, the incubators were tested under the most unfavorable conditions possible in that they were normally packed full of

agar plates. By so doing, their weaknesses were brought out in bold relief. Similar conditions are frequently found in those milk control laboratories that do not observe the standard specification that at least 1 inch of space be left between all piles of plates.

Wide discrepancies in counts and temperatures were produced under the conditions used in our tests. In one case (No. 2, Table I) about 800 plates were poured from one sample of milk and packed in an incubator. The highest average temperature was  $46^{\circ}$  C., the lowest  $37^{\circ}$  C. The average count obtained from plates placed in a carefully controlled  $37^{\circ}$  C. incubator was 38 per c.c. The highest count obtained from any plate of the 800 placed in the incubator under test was 62, the lowest 0. The sterile plates occurred at the hottest temperatures, the highest counts where the temperature was the lowest.

The way in which averages were computed is illustrated by Figure I in which a diagram is given of the lower right hand section of Incubator No. 2. The

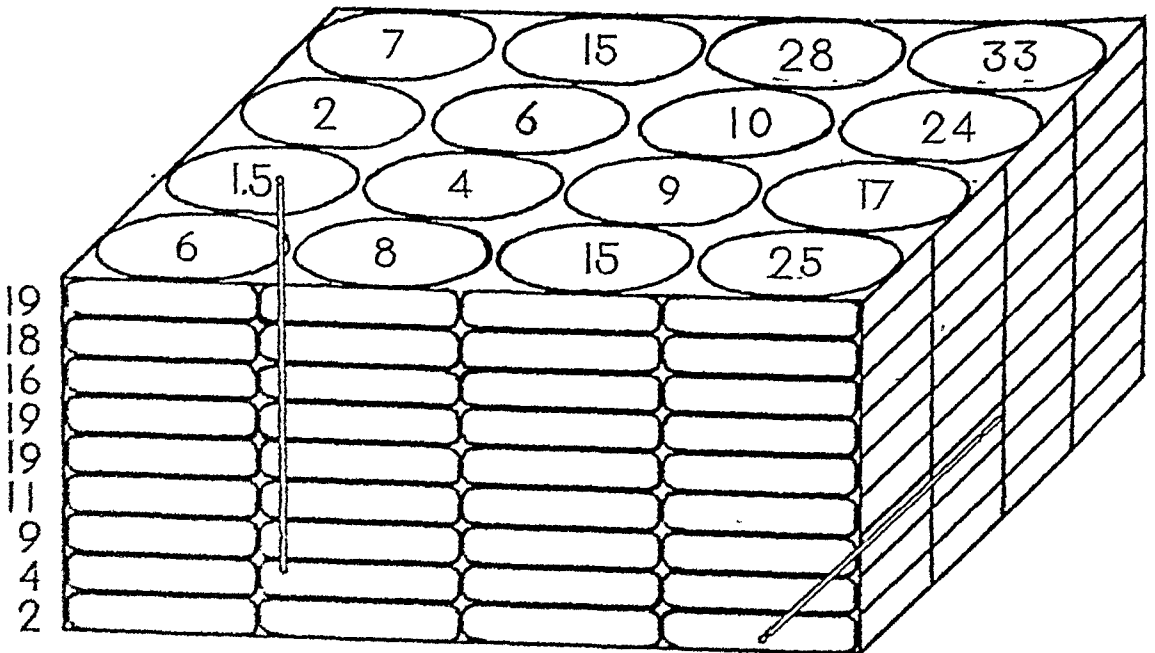


FIGURE I.—Diagram of right lower section of Incubator No. 2 showing the arrangement of plates, the way in which averages were computed and the way in which temperature observations were made.

TABLE I

SUMMARY SHOWING RANGE OF PLATE COUNTS AND TEMPERATURES FROM VARIOUS INCUBATORS

Incubator Number	Type of heating	How filled with Petri plates	Maximum temperature Degrees C.*	Minimum count from any individual plate	Minimum average count †	Standard 37° C. count ‡	Minimum temperature Degrees C.*	Maximum count from any individual plate	Maximum average count
1	Two carbon lamps	3 high, spaced 1" apart	.....	2	23	.....	.....	134	128
2	Two electric plates on bottom	Packed full	46.0	0	0.5	38	37.0	62	38
2	Two electric plates on bottom	3 high, spaced 1" apart	38.5	25	60	88	33.0	144	120
3	Two electric plates on bottom	Packed full	44.0	5	9	200	34.0	336	284
4	Coils under each of 2 shelves	Packed full	39.0	135	144	205	34.5	263	250
5	Elements in front and back on bottom	3 high, spaced 1" apart	42.0	9	17	145	34.0	328	279
6	Elements in front and back on bottom	Packed full	37.5	95	106	148	34.0	260	219
7	Water jacketed	Packed full	37.5	113	160	191	35.5	243	215
8	Heated air forced through	Packed full	37.0	.....	.....	.....	35.7	.....	.....
9	Elements in side and bottom walls	13 high, spaced 1" apart	37.5	.....	21	.....	35.0	.....	52
9	Elements in side and bottom walls	Packed full	45.0	9	17	228	36.5	317	231
10	Water jacketed	Packed full	37.5	79	90	97	34.7	136	113

\* Temperatures are approximated from the average plate counts and thermometer readings.

† Average count of all plates in a pile or tier as the case may be.

‡ Obtained by incubating a few plates in a separate incubator with carefully controlled temperatures.

minimum average count of any pile or tier in this section was the average secured for the second pile on the left hand side (1.5 colonies per plate) while the maximum average count of any pile or tier in this section was 33 colonies per plate obtained from averaging the results from all the plates in the back pile on the right hand side. Two thermometers were used in this section during the experiment. Their position is indicated in the diagram.

The temperature for each pile or tier was estimated by plotting a curve based on the number of colonies that appeared on duplicate plates incubated for 48

hours in carefully controlled incubators operated at a series of temperatures, such as 18°, 25°, 27.5°, 30°, 32.5°, 37° and 45° C. From the averages of the colony counts obtained in these incubators a curve was constructed on a percentage basis, the highest average count (usually found near 32° C.) being considered 100 per cent. From such a curve it was possible to estimate the temperature of any particular pile or tier in the 37° C. incubator by averaging the number of colonies that appeared on the plates in these piles and tiers. For example, where the average of a pile of plates was only 60 per cent



of the maximum average count secured from a series of incubators, the curve secured indicated that the actual temperature of the pile in the 37° C. incubator was 39.5° C. The temperatures observed from the thermometers placed in the 37° C. incubator agreed well with these estimated temperatures.

The samples used were ordinarily of pasteurized milk known to give the highest count at a temperature of 30–32° C. and these samples were known to be free of any significant number of thermophiles. A few raw milk samples were used.

In general, the water jacketed incubators never heated above 37° C. as their heating surface consisted of water at 37° C.; but they were slow in heating the plates and the plates rarely actually reached a temperature of 37° C. even at the end of 48 hours. Such conditions favor obtaining a high count from milk which has a flora that grows best at 30–32° C. Incubators of this type may be affected by very cold room temperatures. However, they yielded the most uniform counts of any of the incubators that were tested.

The anhydric incubators were found to heat quickly as their heating elements may be as hot as dull redness and the heat is carried to the agar plates by air currents. These conditions frequently cause overheating in some section of the incubator, a very unsatisfactory condition in making milk counts as a temperature of even 38° C. lowers the number of colonies that develop, and only a few degrees higher will yield almost sterile plates unless thermophiles are present.

The situation was particularly bad in those types of anhydric incubators that used carbon filament electric lamps as a source of heat, or electric heating plates covering the entire bottom of the incubator. There is no control over the convection currents in these cases, and the plates that are most directly exposed

to the heat are badly overheated. An improved situation is found in incubators where the heating elements are placed at the sides of the bottom or in hollow walls, thereby partially or quite completely controlling convection currents. Such incubators may show under- or over-heating unless the thermostatic control is carefully placed in relation to the convection currents.

Another type of anhydric incubator has the heating elements in 4 or more of the 6 walls, thus imitating the water jacketed incubator. However, greater variations in temperature occurred in these incubators than in the water jacketed types.

In the one type of incubator tested which had a forced draft, outside air was sucked in, heated and driven through at such a speed that it dried out the agar plates badly. Apparently it made a satisfactory drying oven and this was the primary purpose for which it was made. Some large size incubators with a slow forced circulation of the inside air have been described to us that appear to give more satisfactory results.

No incubator rooms have been studied as yet, but it is evident that these possess one advantage over all portable incubators in that they can never be packed to capacity, inasmuch as the center is always wide open thus allowing a free circulation of air. If the convection currents are properly controlled and certain shelves only are used, it is believed that they can be made to produce results that compare well with any of those given for portable incubators.

This work is to be continued until some general specifications can be drawn up for the *Standard Methods of Milk Analysis* report. It should be noted that the need for incubators that will produce a reasonably constant temperature of 37° C. with a fairly heavy load is even greater in routine milk control work than in ordinary bacterial work.

# EXAMINATION OF MILK FOR STREPTOCOCCI OF MASTITIS\*

CLAUDE S. BRYAN

*Department of Bacteriology, Michigan State College, East Lansing, Mich.*

THE examination of milk for streptococci of bovine mastitis is becoming more important from a public health standpoint as stricter sanitary milk control is demanded. The bacteriological or cultural method of milk examination is very important in the detection of udder infections and the determination of the relative extent of disease as indicated by the number of streptococci per c.c. of milk. Frost and Thomas<sup>1</sup> describe a technic for collecting and culturing milk samples which has been employed in this laboratory. Considerable care is necessary in carrying out the technic and the required help in culturing the samples is usually not available. Rosell<sup>2</sup> describes a technic which has disadvantages similar to that of Frost and Thomas and in addition extreme precautions in the collection of the sample are advised. There is a need for a rapid and accurate method of collecting and culturing milk samples with a minimum number of workers required. Such a method is herein described.

## SAMPLING

Satisfactory samples are obtained if they are taken in the normal environment of the cows. The udder and teats are wiped with a cloth moistened with an antiseptic solution. Two streams of milk from each quarter are collected in a strip cup and examined for physical evidences of mastitis. Then approximately 10 c.c. of the milk is collected directly into an ordinary sterile bacteriological test tube. The rapidity of the culturing technic makes it possible to

take individual samples from each quarter and thus immediately to detect the quarters that are infected. Proper care is exercised in transporting the samples to the laboratory where they are cultured as soon as convenient after collection.

## CULTURING

Each sample is inverted several times to insure thorough mixing of the milk and cream, after which 0.1 c.c. is placed in a sterile Petri dish, thus giving a dilution of 1 to 10. If desired, the cream layer can be used in culturing since many streptococci are carried up by the fat globules as they rise to form the cream layer. To each Petri dish is added, aseptically, 8 to 10 c.c. of gentian-violet liver infusion blood agar and rotated thoroughly to mix the agar and the milk. The plates are then incubated at 37° C. for 36 hours. Gentian-violet liver infusion blood agar was studied comparatively with gentian-violet veal infusion blood agar and also dextrose blood agar. The milk was diluted 1 to 20 and 1 to 100 for plating when the dextrose agar was used. The results are given in Table I. Photographs of cultures on each of these mediums are shown in Figures 1, 2, 3 and 4.

Preliminary experiments showed that 10 c.c. samples were as accurate as larger ones, so the collection of this size sample was adopted as standard procedure. The beef liver infusion agar introduced by Staflseth<sup>3</sup> and further developed by Huddleson<sup>4</sup> was employed with no change in composition. The pH of the agar was adjusted to 7.2 and filtration was effected through porcelain filter cotton. For convenience 250 to 350 c.c.

\* Journal Article No. 99 (n.s.), Michigan Agric. Exper. Sta.

amounts of agar were placed in 500 c.c. flasks and sterilized. To the melted agar cooled to approximately 50° C., was added sufficient 1 per cent aqueous gentian-violet so the final dilution of the dye was 1 to 150,000. Then aseptically collected bovine blood was added to make a 5 per cent blood agar.

Experiments performed using brilliant green as the inhibitory agent indicated that it could be substituted for the gentian-violet. Approximately 10 c.c. of agar is used per plate; with very little practice this amount can easily be poured. The dye in the agar inhibits the udder saprophytes and contaminants from the air at the time of collection of samples without affecting the growth of the streptococci. Figure 1 shows a sam-

ple of milk plated in liver infusion blood agar without any inhibitory agent while Figure 2 shows the same sample with gentian-violet 1 to 150,000 in the medium as the inhibitory agent. It is very often rather difficult to interpret accurately cultural results due to the vast number of organisms found in milk which culturally may resemble streptococci. The gentian-violet inhibits these non-significant organisms and thereby an accurate count of streptococci may be obtained. The comparative value of the different mediums is self-evident from the results in Table I. In each case the liver-infusion agar gave a higher count of streptococci than the other two mediums. Exact counts of streptococci in the dextrose blood agar are impossible

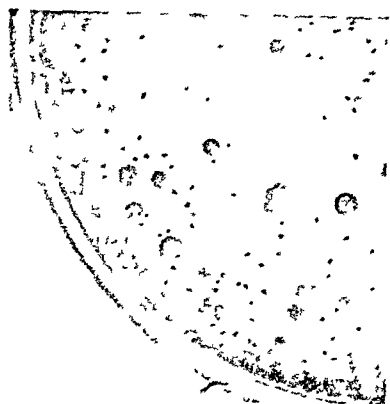


FIGURE 1—Sample of milk plated in liver infusion blood agar without any inhibitory agent



FIGURE 2—Same sample as in Figure 1; gentian-violet 1 to 150,000 was added to the medium as the inhibitory agent



FIGURE 3—Sample of milk from infected cow cultured in gentian-violet liver infusion blood agar



FIGURE 4—Same sample as in Figure 3 cultured in gentian-violet veal infusion blood agar

TABLE I  
COMPARATIVE VALUE OF THE VARIOUS MEDIUMS

Bacteria per c. c.						
Sample number	Gentian-violet-liver-infusion-blood agar		Gentian-violet-veal-infusion-blood agar		Dextrose blood agar	
	Streptococci	Other organisms	Streptococci	Other organisms	Streptococci	Other organisms
1	.....	.....	.....	.....	.....	3,810
2	.....	.....	.....	.....	.....	3,175
3	6,985 (alpha)	.....	4,810 (alpha)	.....	2,260 (alpha)	5,985
4	.....	60	.....	.....	.....	5,080
5	.....	.....	.....	20	.....	1,905
6	560 (beta)	.....	310 (beta)	.....	420 (beta)	3,275
7	.....	.....	.....	.....	.....	2,540
8	3,175 (alpha)	.....	2,080 (alpha)	.....	1,760 (alpha)	2,050
9	2,540 (alpha)	.....	1,840 (alpha)	.....	1,210 (alpha)	1,965
10	3,810 (alpha)	.....	2,475 (alpha)	.....	2,480 (alpha)	1,965
11	300 (alpha)	.....	120 (alpha)	.....	180 (alpha)	1,090

since their differentiation from other organisms is based only on colony size and appearance.

Figure 3 shows a sample of milk from an infected cow cultured in gentian-violet liver infusion blood agar and Figure 4 shows the same samples cultured in gentian-violet veal infusion blood agar. There is a slightly higher incidence of streptococci and the colonies grow to a much larger size and thus demonstrate their characteristics more plainly on the liver infusion agar.

If culture isolations are desired they should be made immediately at the end of the 36-hour incubation period since later there is a danger that organisms may be killed by the acid formed upon the fermentation of the sugar and glyco-gen found in the liver. Pour plates are recommended but good results are obtained by placing 0.1 c.c. of the milk sample on the surface of the hardened agar and spreading the milk by the use of a bent glass rod.

#### CONCLUSIONS

1. Elaborate precautions in collection of milk samples for streptococcus examination are not essential; simply wiping the udder and teats with an antiseptic moistened cloth is sufficient.

2. Ten c.c. samples from each quarter or cow are representative.

3. Greater ease and accuracy in interpretation of cultural results are possible at the same time quantitative results are obtained.

4. Gentian-violet liver infusion blood agar is a superior medium to use in culturing milk for streptococci. Brilliant green may be substituted for the gentian violet.

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## VITAL STATISTICS

**Occupational Fatality Rate Lowest in Twenty Years**—Greatly reduced industrial activity throughout the whole of 1931 resulted in the lowest death rate from accidental injuries arising out of or in the course of employment ever recorded for adult white male policy holders insured in the industrial department of the Metropolitan Life Insurance Company. The facts for a 20-year period, for which such records are available show this clearly.

Occupational fatalities during 1931 occurred at the rate of 27.3 deaths per 100,000 adult white male policy holders; a decline of 12 per cent from the rate of 31.0 per 100,000 for 1930. Each of the principal means of accidental injury showed a marked decline, as compared with 1930, with the exception of occupational automobile accidents, for which the rate increased 21 per cent. The rate in 1931 for all occupational fatalities was 0.2 deaths per 100,000 lower than that in 1915, and 2 deaths per 100,000 lower than in 1921, the years with the next lowest rates. These years, like 1931, were characterized by low business activity and widespread unemployment. In general, the insurance analysis shows that the curve for the occupational fatalities follows the curve of business conditions. The low rates for the years cited are in striking contrast to the high rates for 1913, 45.7 per 100,000; 1918, 40.9; and for 1923, 40.1 per 100,000. The high rate in 1913 exceeded the low rate in 1931 by 67 per cent.

Data for adult colored male policy holders are available only since 1921. Death rates for these policy holders were found to be from 2 to 15 per cent higher than those for white males in the corre-

sponding years, with the exception of 1931, when the rate for the colored dropped to 26.9 per 100,000 as compared with 27.3 for the white policy holders.

Traumatism by falls was the most frequently reported means of fatal occupational injury in 1931 among our adult white male policy holders. Deaths occurred through this means at a rate of 4.8 per 100,000. Closely following falls were automobile accidents with a rate of 4.6 per 100,000. Other important means of injury, in the order of their death rates were—traumatism by machines (3.1), traumatism in mines and quarries (3.0), steam railroad accidents (1.9), electricity (1.5), accidental drowning (1.3), and accidental burns (1.0).

Traumatism by falls was the leading means of occupational injury in each year since 1927, and also in the years 1925, 1924, and 1921. Steam railroad accidents were the principal means for the entire period 1912 to 1920, and again led the list in 1922, 1923, and in 1926. This change in the position of railroad accidents and traumatism by falls in recent years, was not brought about by an increase in the death rates for falls, which, on the whole, have fluctuated within fairly narrow limits in the 20-year period, but by the decline in the rate for railroad accidents. From the high point of 12.5 deaths per 100,000 in 1913, the rate for this type of accident has declined to 1.9 deaths per 100,000 in 1931. Much of this decline is undoubtedly real, and reflects a reduction in the accident hazard of railroad employees due to the safety measures introduced by the roads. But the extremely low rates recorded in 1930 and in 1931 must be ascribed in large meas-

ure to the very unfavorable economic situation of the railroads in these years, involving reduced traffic and fewer employees.

Industrial automobile accidents have come up from a place near the bottom of the list in 1912, to second place in the years 1930 and 1931. In the latter year, the rate (4.6) was but 0.2 deaths per 100,000 behind the rate for falls. If the present tendency continues, automobile accidents will soon be the leading means of fatal occupational injury.—Met. Life Ins. Co. *Stat. Bull.*, 13: 1-2 (Mar.), 1932.

**Preliminary Report of Vital Statistics for New Jersey, 1931**—The preliminary report of vital statistics for New Jersey shows that the low general death rate and infant mortality rate of 1930 were maintained in 1931. The general death rate of 10.63 in 1931 was identical with the rate for 1930, which rate was the lowest recorded in the state since the establishment of the State Department of Health 54 years ago. The previous low rate had been 11.43 for 1927. The infant mortality rate was 56.9 per 1,000 live births, which was only slightly higher than the lowest rate ever attained in the state. The lowest rate, 56.7, occurred in 1930.

Approximately 64,050 births were reported in New Jersey in 1931, showing a birth rate of 15.43 per 1,000 inhabitants. The total births show a decline of approximately 4,150 births from the number reported in 1930. This decrease of more than 6 per cent is the greatest decrease in births which the state has suffered at any time since 1878, when the reporting of births became obligatory.

New low levels in death rates from typhoid fever, diphtheria, and tuberculosis were reached in 1931, when the rates were 0.9 for typhoid fever, 2.9 for diphtheria, and 65.1 for tuberculosis (all forms). The maximum typhoid fever death rate in New Jersey was experi-

enced in 1882 when the rate was 74.3. Since 1912, the annual death rate for this disease has not exceeded 10 deaths per 100,000 population.

The death rate from diphtheria for 1888 was 148. During the decade beginning with 1900 the rate declined from 48 to 25. The following 10-year period showed a decline to 18.

The rate of 65.1 for all forms of tuberculosis in 1931, compared favorably with the rate of 90.1 for this disease 7 years ago. The death rate from cancer and other malignant tumors was 113.5 in 1931. This cause of death has increased gradually in importance, since 1879 when the death rate was 37 per 100,000.—*Pub. Health News-Monthly Bull.*, Dept. of Health, New Jersey. 17: 45-6 (Feb.-Mar.), 1932.

**Vital Statistics in Porto Rico, 1930**—The enumeration of the census of Porto Rico in 1930 made possible the thorough revision and correction of the vital statistics of the island, for the last 20 calendar years, beginning with 1911. As compared with the fiscal year, the calendar year is a much more logical and generally accepted basis for estimating vital statistics figures; this basis makes the figures for Porto Rico more comparable to those of the world at large.

The death rate for Porto Rico in 1930 was 18.6 per 1,000 population as compared with 25.3 for 1929 and 23.6 for 1928, when the rate was increased as a result of the San Felipe hurricane which occurred during the latter part of 1928. With the exception of the years 1917 and 1918, when the general death rate was 30.9, because of the severe epidemic of influenza and measles, the years 1928 and 1929 showed the highest death rates in the last 20 years.

There were 54,574 births registered in 1930 as compared with 52,468 the previous year; the birth rates for 1929 and 1930 were 34.4 and 32.2 respec-

tively. Marriages in 1930 numbered 9,961, the marriage rate being 12.8 per 1,000 population, as compared with 10.9 in 1929. Infant mortality which had flared up along with the general death rate in 1928 and 1929 to 167 and 161 for those years, respectively, declined in 1930, to a rate of 126 per 1,000 live births.

While the health conditions in Porto Rico are by no means satisfactory, it is indeed gratifying to note a reduction, and in some cases a great reduction in the deaths from several causes. Seven causes of death showed reductions of more than 30 per cent, the greatest reduction being noticed in the death rates from dysentery (80 per cent); hookworm disease (53 per cent); influenza (68 per cent); and diarrhea and enteritis, which declined 35 per cent among children under 2 years of age, and 47 per cent among those 2 years and over. The 1930 death rate from diarrhea and enteritis among children under 2, was 195 as compared with 284.6 in 1929; for children of 2 years and over, 132.2 in 1930 as compared with 249.9 in 1929. The death rate for malaria declined from 137.9 in 1929 to 121.08 in 1930; congenital debility from 107 to 84.2; bronchitis from 80.9 to 57.6; dysentery from 33.5 to 6.6; nephritis from 205.6 to 133.8; bronchopneumonia from 125.9 to 97.9; typhoid fever from 14.5 to 8.5; hookworm disease from 50.4 to 23.7; influenza from 10.4 to 3.3; and tuberculosis (all forms) from 301.4 to 263.2.

As can be observed by the high mortality rate from tuberculosis this disease is a very important public health problem in Porto Rico, and as such it is engaging the interest and attention of the health authorities of the island. Among the important activities in the control of tuberculosis are the better provision for hospitalization of the advanced cases; the care of 30 children at the Preventorium at Guaynabo; the provision of milk for the children at-

tending the rest rooms for undernourished children in San Juan and in the camp for undernourished children at Aibonito; and the maintenance of milk stations in practically every town on the island.

Heart disease, cancer, and external causes were the only important causes of death which showed increases in 1930, over the previous year. This is typical of the experience in most other countries. —*Report of the Commissioner of Health of Porto Rico. Fiscal Year Ending June 30, 1931, pp. 13-22.*

**Report of the Registrar-General of the Irish Free State for the Year 1930**—The estimated population of the Irish Free State in the middle of the year 1930 was 2,946,000, the same as for 1929, but 26,000 less than the population disclosed by the Census of 1926. Marriages and births registered during the year show increases, and deaths and emigration show decreases as compared with 1929, the decrease in net emigration being 5,238. The number of marriages was 13,631, and the marriage rate was 4.63, as compared with a rate of 4.61 in 1929, and the annual average, in the last 10-year period 1920-1929, of 4.86. The marriage rate of the Irish Free State is low as compared with the other countries of Great Britain. In Northern Ireland, the rate for 1930 was 6.07 per 1,000; in England and Wales 7.9; and in Scotland 6.89.

The birth rate for the Irish Free State in 1930 was 19.81 and in the preceding year 19.78. Although the 1930 rate is slightly higher than the rate for 1929, the increase is so small as to compensate very little for the gradual but steady decline in birth rate that has been noticeable in recent years. Between the periods 1911-1915 and 1925-1929 there has been a fall of 9.7 per cent in the birth rate.

The number of deaths registered during the years was 41,702, or 14.16 per

1,000 inhabitants. This is the smallest number of deaths ever recorded for a single year in the country, but on account of the decline in population the rate is not the lowest on record. Lower rates have been reported twice within the last decade—14.01 in 1923, and 14.06 in 1926. The death rate for tuberculosis continues to decline, although the rate for the Irish Free State is still high as compared with other countries; it was 129.8 in 1930 as compared with 131.5 in 1929. The tuberculosis deaths in 1930 constituted 9.2 per cent of the total deaths for the year.

There were 213 more deaths from cancer in 1930 than in 1929, increasing the death rate from 105.8 in 1929 to 113.0 in 1930. The cancer record for 1929 had been encouraging because the rate that year had shown a decrease from 108.2 in 1928.

Deaths from diseases and accidents of pregnancy and childbirth numbered 278 or 4.77 per 1,000 births registered as against an average of 295, and a rate of 4.82 per 1,000 births in the 10 years 1920-1929. The infant mortality rate for 1930 was 68, as compared with 70 for the preceding year and 71 as the annual average for the preceding 10-year period.—*Annual Report of the Registrar-General of the Irish Free State for the Year 1930.*

**Infant Mortality in 1930**—The infant mortality rate for the 860 cities in the birth registration area of the United States in 1930 was 62.2 per 1,000 live births or 4.0 points below that of 1929 when the rate for 720 cities was 66.2. The 1930 rate is thus the lowest yet attained for the cities of the country.

Among the largest cities, those over 250,000 population in 1930, the lowest rate reported is for Seattle, Wash., the figure being 37. San Francisco, Calif., stands next with a rate of 40, and Portland, Ore., third with a rate of 41. In

the population group 100,000 to 250,000, Long Beach, Calif., is low with a rate of 43. Tacoma, Wash., is next with 44, and Elizabeth, N. J., third with 45. Within the group of cities with populations of 50,000 to 100,000, Oak Park, Ill., with a rate of 28 is first, followed by Glendale, Calif., 30, and Newton, Mass., 31. Of the cities between 25,000 and 50,000 population, Alameda, Calif., with a rate of 21 stands first. Everett, Wash., with 27 is second, and Hutchinson, Kan., with 30 is third. In the group of smallest cities, those with 10,000 to 25,000 population, Shorewood, Wis., has an infant mortality of zero. Maplewood, Mo., has a rate of 6, and Webster Groves, Mo., 9.

It is interesting to note that the list of 15 cities (3 from each population group) having the lowest infant mortality in 1930, includes 8 cities located in the Pacific Coast states; the list of 15 cities (3 in each population group) showing the highest rates, includes 8 cities located in the southern and southwestern states, 4 in Tennessee alone.

When the cities are grouped by population, the largest cities are found to have the lowest average infant mortality rate. These rates are computed from the sum of the births and the sum of the deaths under 1 year. For the group of cities with 250,000 population or more in the birth registration area, the rate in 1930 was 60.0. The smallest cities as a group have the highest rate, 66.6. This fact confirms the experience of previous years.

Infant mortality rates in the birth registration area show a wide variation from zero at one extreme to 259 at the other. About a quarter of the cities have rates below 50. Not quite half have rates between 50 and 70. Nearly a third have rates above 70. Of the 10 largest cities in the country in 1930, Chicago and St. Louis had the lowest infant mortality rate, 54 for each city. Cleveland stands next with a rate of 55,



and New York fourth with 57. Next comes Philadelphia with a rate of 59, followed by Los Angeles (61), Detroit and Baltimore (65), and Pittsburgh and Boston (69). Of these 10 cities, Boston alone showed no reduction in infant mortality from 1929 to 1930, the rate

for both years standing at 69. The 9 other cities in the group showed reductions varying between 3 and 11 per cent. The reduction of 11 per cent was for Baltimore, which had an infant death rate of 73 in 1929.—*Stat. Rep. Infant Mortality*, A. C. H. A., 1930.

## PUBLIC HEALTH ENGINEERING

**The Sewage Works of Essen-Rellinghausen and the Operation of the Latest Extensions**—The plant deals with a dry weather flow of 30,000 cu.m. per 24 hours. The strength of the sewage is similar to that of an average domestic sewage. The trade waste waters included are mainly from coal mines, iron works, dye works, and laundries. Preliminary treatment is accomplished by screens, sand and oil traps, Emscher tanks, and a flat clarification tank with separate sludge digestion tanks, and further treatment in an activated sludge plant. The units of the plant are described and illustrated.

The material deposited in the sand trap is treated with compressed air to separate sludge. The oil trap consists of an aeration chamber, from which the sewage overflows into stilling chambers where the floating oil is retained by walls under which the sewage flows back to the aeration section. The collected fats are either burned with the screenings or digested with sludge. The Emscher tanks are 20 years old and, in spite of much overloading, have given no trouble. The water content of the sludge varies according to the amount of excess activated sludge which is returned to the plant.

The flat clarification tank is fitted with Dorr sludge scrapers and a scum

remover and double inlet and outlet weirs to increase the tank capacity when the flow is increased by rain. For experimental purposes, one digestion tank was built flat, with a Dorr sludge remover, and another with a floor inclined downward toward the center. Both are fitted with submerged gas covers, stirring apparatus for breaking the scum, and heating and stirring arrangements.

The tanks are now being used in sequence, artificial heating being used in the first stage only. Scum has formed above the gas cover in the first tank but not below the cover.

The effect of clarification and digestion on the amount of sludge and on its water content and the effect of temperature on the amount of supernatant water are discussed. The sludge gas beyond what is used for heating the digestion tank is added to the city gas supply. The gas amounts to an average of about 16 litres per head per day and would be sufficient to supply the power needs of the plant. Gas from the Emscher tanks contains considerably less carbon dioxide than that from separate digestion. Hydrogen sulphide (due to sulphate from mine drainage) is removed by passing through bog iron ore. Sludge is deposited on drying beds in wet weather but otherwise on fields.

A drum screen in the channel leading

to the aeration tank is brought into action when required to prevent Chironomid larvae reaching the activated sludge plant. There are 4 aeration tanks using a combination of compressed air and submerged paddles. Porous plates suitable for such aeration are discussed. Two 8 m. deep hopper-shaped settling tanks have been found to give less operation trouble and better results than one 6 m. deep with double hopper bottom. Return sludge and dilution water containing oxygen are added in the channel leading to the aeration tank.

The power requirements and effect of the activated sludge treatment, and the plant for burning screenings and oil-trap residue are described.—F. Fries, *Gesund. Ing.* 54:661 and 681, 1931. *Summary of Current Literature, Water Pollution Research V*, 2 (Feb.), 1932.

**A Review of Water Treatment by Ammonia - Chlorine Process**—The development of ammonia-chlorine treatment for taste control is discussed. It was adopted at Indianapolis in 1930, anhydrous ammonia being applied to the raw water just prior to its chlorination. Owing to certain difficulties in handling the anhydrous ammonia, it was decided to use the cheaper ammonium sulphate instead. This has given entire satisfaction. It is applied mixed with aluminium sulphate. The ratio of ammonia to total chlorine has varied from 1:2 to 1:3, the ammonia dose ranging from 2.3 to 3.1 lb. per mil. gal. The sulphate used normally contains 0.003 per cent of phenol.

The results of this treatment are better disinfection, elimination of phenol tastes and of some of the other tastes resulting from chlorination, elimination of aftergrowths, the maintenance of a higher chlorine residual without noticeable tastes, and probably a reduction in the total chlorine requirement.

Experience has shown that a fairly

hard water containing an appreciable quantity of calcium responds readily to the treatment and that corrosion is not accelerated.—H. E. Jordan, *Water Works Eng.*, 84:1388, 1931. From *Summary of Current Literature, Water Pollution Research, V*, 3 (Mar.), 1932.

**Modern Sewage Disposal Exemplifies Chemical Engineering Progress**—The author deals with the growth of mechanization in sewage treatment and discusses the design and use of screens, grit chambers, Imhoff tanks, and settling tanks with mechanical sludge removal. Aeration and agitation methods used in the activated sludge process are described and the possibilities of value of recovery from sludge as fertilizer or in other ways are discussed. The author then deals with separate sludge digestion, the composition, amount and utilization of sludge gas, the effect of temperature and pH on digestion, thermophilic digestion, and the drying or dewatering and use as fertilizer of digested sludge.

Present research is directed toward the concentration of fresh solids before digestion, rapid digestion at high temperature, mechanical dewatering of digested sludge and its disposal at the lowest possible cost.—F. W. Mohlman, *Chem. Metall. Eng.*, 38:520, 1931. From *Summary of Current Literature, Water Pollution Research, V*, 2 (Feb.), 1932.

**Methods and Aims of Agricultural Utilization of Sewage in Central Germany**—The industrialization of central Germany in the last 20 years and the resulting increase of population are briefly described. The region is one with a fairly low average rainfall so that there is little natural reserve of water to meet increased demands. The supply must be drawn from ground water as the rivers are in general too polluted for use. Impounding reser-

voirs and central water works are being used wherever economically possible. Damming the rivers, as is being done on the Ruhr, would have little effect on the supplies, which are mainly ground not ground-filtered water, and would not have the same purifying effect as the pollution is largely organic and putrescible matter.

The agricultural utilization of sewage is therefore of importance. By this means the ground water supply is supplemented and damage to land by the withdrawal of ground water is prevented.

König has calculated that good results can be obtained by utilizing town sewage at the rate of 2,000–5,000 cu.m. a year per hectare, depending on the condition of the soil. These quantities would, taking into account the increased wastage by evaporation and seepage, make up the average yearly 400–500 mm. rainfall to the optimum for the crops grown of 600–700 mm. These quantities of sewage can be easily assimilated by the soil. The choice of process (artificial rain or irrigation) depends mainly on the contour of the surface, irrigation used on slopes and artificial rain on flat or uneven land.

The suitability of town sewage and various industrial waste waters as fertilizer and methods of irrigation and artificial raining are discussed. The pre-treatment necessary varies from coarse screens to settling plants with 1–2 hours' retention. Where new plants are necessary, settling tanks with 15–20 min. retention, with separate digestion tanks of 20 litres a head capacity are recommended. Settling tanks to retain the sewage about 1 month are necessary when frost renders agricultural utilization impossible.

The control of the distribution of sewage, the operation of the plant, and the financial arrangements are discussed. The processes of purification of the

sewage in the ground are described and the absence of hygienic objections to the agricultural utilization of sewage is emphasized.—A. Carl, *Gesund, Ing.*, 54: 765, 1931. From *Summary of Current Literature, Water Pollution Research*, V, 5 (May), 1932.

**Water Supply and Sewage Disposal in Cairo, Egypt**—Egypt has a total population of 14 million, mainly rural. There are 28 water works filtering surface water, and 22 untreated supplies from wells. The supplies are under the control of the Department of Public Health. The demand averages 30–35 gal. per head per day.

The Cairo supply for a population of 800,000 is drawn from the Nile. The content of suspended matter varies from 150 to 1,500 p.p.m. Alum is added at the intake pipe and the water is pumped to settling tanks. Fifty per cent is treated in primary tanks with Dorr clarifiers and then in secondary tanks, while the remainder passes direct to secondary tanks. The water is then passed through rapid sand filters with air-water wash, and chlorinated.

Algae growths in the river cause trouble and copper sulphate treatment has not been beneficial. Sewage is of a strong domestic type and disposal is generally by sewage farming. The sewage is generally pumped for some distance and is septic, causing corrosion in sewers and odor nuisance. The Cairo sewage is pumped 15–20 miles and treated in Travis tanks.

Sludge is dried on sand beds and sold for fertilizer. The effluent is used on the state farm. About 1 per cent is treated on stone filters. Some chemical results are given.—J. Heukelekian, J. Series Paper, New Jersey Agri. Exper. Station, New Brunswick, reprinted from *Pub. Works*, Mar., 1931. From *Summary of Current Literature, Water Pollution Research*, V, 5 (May), 1932.

Moreover these studies do not account for acclimatization. For these reasons the authors have undertaken the problem of the establishment of optimum conditions for light and heavy work.

It is pointed out that until perspiration sets in, skin temperature runs parallel to the sensation of heat and that a definite subjective sensation of warmth or cold corresponds to a definite skin temperature. For this reason the authors believe that skin temperature represents the objective index, both of the thermal effect and subjective sensation. They quote Marshak to the effect that the normal range of skin temperature of man at rest is between 31.5 and 33.5° C. So long as the skin temperature remains in this range the subject is comfortable, neither hot nor cold.

In the experimental studies they determined the optimum conditions for light and heavy work which do not result in the production of perspiration, and utilize the temperature of the forehead and sternum as indexes. In the range of perspiration use was made of a method of W. L. Minor, for the quantitation of the degree of perspiration present. In this technic the forehead is covered with a light coating of a mixture of iodine, alcohol, and castor oil, and is then powdered with rice starch. They have designated 6 degrees of perspiration:

1. Separate dots
2. Large dots
3. Spots and dots
4. Small patches
5. Large patches with confluence
6. Profuse washing away of starch

The authors have established the fact that in every given phase of perspiration the subject experiences a corresponding sensation of warmth. The light work experiments were conducted on seamstresses, the skin temperatures being recorded by means of a resistance thermometer. It was found that the skin temperature closely followed the room

temperature and that the sensations of the subjects closely followed the skin temperatures. At room temperatures lying between 18 and 22° C. the skin temperature was found to be in the comfort range. A table is prepared showing the relationship between dry bulb temperature, humidity, and the air velocity necessary for optimum air conditions.

The heavy physical work experiments consisted in raising and lowering a 16 kg. weight. A table is presented showing the optimum air conditions for the conduct of such heavy physical labor.—G. D. Arnaoutow and E. W. Weller, *J. Indus. Hyg.*, 14, 4 (Apr.), 1932.

L. G.

**Malignant Growths Resulting from Exposure of Radioactive Substances**—Up to this time there have been some 18 fatalities among workers engaged in the painting of watch and clock dials with radioactive substances. Among these persons 2 deaths were brought about by bone sarcomas prior to 1929—1 in 1924 and 1 in 1927. Since 1929, 3 more deaths from bone sarcoma and 3 additional cases of this disease have been reported.

Dr. Martland points out that there appears to be a decided difference in the clinical and autopsy findings in the early cases as contrasted with the later ones which have occurred since 1929. The first 13 deaths which occurred between the years 1922 and 1928 developed in from 4 to 6 years after cessation of employment. These cases were characterized by the development of anemia and necrosis of the jaw bone.

In the later cases, occurring in a period from 6 to 7 years from the termination of employment, the patients appeared to have escaped extensive necrosis of the jaw bone and the fatal anemia, and instead showed chronic crippling bone lesions, most frequently present in bones subjected to weight, pressure, or trauma. Anemia is also present in these

confinement, traumatic neurosis, and the preparation of standards for the recognition of injury, disease or death due to occupational causes. There were likewise lectures on occupation and eyesight, and standards of nutrition and standard diet.

The meeting was attended by more than 100 persons, including government officials and factory physicians. The next annual meeting will be held in Tokyo.—*Indust. & Labor Inf.*, 41, 4: 75 (Jan. 25), 1932. E. R. H.

#### Pulmonary Fibrosis: Experiments of Short Duration—Authors' Conclusions:

It seems probable that the fibrosis of the lungs produced in workers exposed to dusty atmospheres, especially those in which fine particles of silica make up the larger percentage of the dust, is an end product and represents a progressive defeat of the protective mechanisms of the body. It is never found until the lung fails to rid itself of dust carried out of the bronchi by ciliary action or of dust carried through the lung by way of the lymphatic channels. With the breakdown in the carrying mechanisms, the burden of protection is the phagocytic cell, which, with its load of engulfed material, passes to all parts of the lung and ultimately becomes immobilized in those portions of parenchyma in which lymphatic tissue is abundant. The cells concerned are polymorphonuclear leukocytes, which are the first to appear, to disintegrate and to disappear, and clasmotocytes, which appear later, are extremely active, break up less readily, and may become transformed into fibroblasts. In association with the tissue fibroblasts the clasmotocytes form scar tissue.

Finally, fibrosis is the result of the action of substances secreted by the cell on the foreign particles. If a tissue poison results from this chemical action, fibrosis is encouraged, and is progressive, lasting as long as the unaltered irritant remains in the lung.—

Willis S. Lemon and George M. Higgins, *Am. J. Med. Sci.*, 183, 2: 153-164 (Feb.), 1932. E. R. H.

**Anthracosis and Silicosis**—Sir William Jenkins asked the Home Secretary what number of men had claimed compensation who were suffering from sili-

cosis in South Wales; the number who succeeded in their claim; and the number refused, if any, and upon what grounds. Sir Herbert Samuel replied: "Separate figures for South Wales are not available, but the Returns for Great Britain show that in 1929 there were 12 cases, and in 1930, 18 cases of coal miners who recovered compensation for disablement from silicosis. The Returns for 1931 are only now being collected. I regret that I am not in a position to give the total number of claims made or refused, or the reasons for refusal."—House of Commons (Feb. 11), *Lancet*, 5660: 430 (Feb. 20), 1932. E. R. H.

**Industrial Hygiene**—A serious silicosis hazard was found at a plant in Maryland which was engaged in crushing and screening quartz for use in various industries. Atmospheric dust tests revealed extremely high concentrations of quartz dust consisting of practically 100 per cent free silica under 10 microns in size. The investigation was made by Dr. B. F. Meriwether, Surgeon, U. S. Bureau of Mines, and J. J. Bloomfield, Asst. Sanitary Engineer, U. S. Public Health Service. Physical examination of employees exposed from 4 to 30 months showed a percentage of defectives which was more than twice as great as those encountered by the examiner in the majority of small industries, although the shortness of the period of exposure did not reveal much positive evidence of silicosis. Nevertheless one of the officials of the plant, whose period of exposure had been longer, died recently from silicosis after less than a year's confinement to bed.

The methods used for eliminating the dust hazard were extremely crude and practically worthless. Recommendations were made for the installation of an efficient dust collector of the cloth-screen or bag type and the enclosure of all grinding machinery, screens, elevators, and conveyor pipes with an ex-

haust ventilation system. Emphasis was placed upon selecting workmen free from defects predisposing to silicosis and that preference be given for those under 40 years of age.

A study was made of the lead hazard in acetylene-torch operation in the cutting of steel plates coated with red lead at the ship scrapping plant of a company at Curtis Bay, Md., where an acute case of lead poisoning occurred. Even though most of the work is conducted out of doors, a compressed air respirator was recommended, since much of the work had to be done in confined spaces aboard ship.

At the Maryland State Normal School acute symptoms of amyl acetate irritation developed in a painter engaged in spray painting without the protection of a booth and exhaust ventilation. An inspection showed that the usual hazards of spray painting (health as well as fire) could be removed.—*Ann. Rep., State Board of Health of Maryland, 1930, pp. 191-195.* E. R. H.

**Refrigerants Tested for Toxicity**  
—At the Atlanta Meeting of the American Chemical Society the first report was made concerning dichlorodifluoromethane, which was described as a non-toxic refrigerant. Subsequently, certain characteristics of this material, which has become known to the trade as Kinetic No. 12, or as F 12, have been determined and the results given considerable publicity.

Tests were made covering 10 of the commonly used refrigerants, subjecting animals to the same for varying periods of time (shown in tables) with the conclusion that the new refrigerant named above was the least toxic.

The results of the tests here discussed show, according to the report, that practically the only hazard which may be introduced with the use of this new refrigerant occurs when vapors come into direct contact with an open flame or high temperature, and are decomposed. Obviously, such a hazard would be

decreased in the absence of circulation of the atmosphere, which would bring the heavy vapors into contact with the flame or hot surface, and where there was customary ventilation of the room. In any event, the harmful products of decomposition would be pungent and irritating so that even minute amounts would give ample warning. It seems almost beyond the limits of probability that there would be present any person who could not or would not recognize the warning gases and either ventilate the room or leave it long before experiencing either prolonged exposure or concentrations dangerous to health.—

*Indust. & Eng. Chem., News Edition, 10, 1: 3-4 (Jan. 10), 1932.* E. R. H.

### Gases that Occur in Metal Mines

—The gases found in metal mines some of which are explosive and some health-hazardous are methane, hydrogen, carbon dioxide, those of sulphur and nitrogen, carbon monoxide, and, where fires occur, the oxides of arsenic, antimony, etc. In addition very finely divided dusts exist.

A discussion is given of these substances and reports concerning them in the different mining districts of the country. Precautions against gases found in metal mines with recommendations providing against fires and the control of ventilation, temperature and humidity are discussed, likewise the methods for the detection of gases and especial respiratory protection against them.—D. Harrington and E. H. Denny, U. S. Bureau of Mines, *Bull. 347, 1931, 21 pp.* E. R. H.

**Time Loss in Mississippi Factories**—Reports were received by the Bureau of Industrial Hygiene and Factory Inspection from 10 factories in Mississippi for 1931 which revealed time loss of 4,511 days.

In preventing illness among factory employees, the state factory inspector made physical examinations of 855 factory workers and vaccinated over 2,000 workers—a service available to any factory desiring it. Numerous safety de-

vices were installed to prevent accidents. Occupational diseases are not a big problem in Mississippi factories, although a few are reported each month.—Felix J. Underwood, State Health Officer, *Weekly Health Suggestions*, Mississippi (Received Dec. 1931).

E. R. H.

**Rates of Physical Impairments in 28 Occupations, Based on 17,294 Medical Examinations**—In a previous study it was shown that the rates of physical impairment in a group of skilled workers tended to be definitely higher than in other groups (professional, business, agricultural). The present study has found that the higher rates are not to be explained, except in a few instances, as due to the hazard of any specific occupation.

"On the contrary, these higher rates seemed to be the result of various factors associated with social, educational, or economic causes, and to be present, in more or less degree, in every specific occupation studied."—Rollo H. Britten, *Pub. Health Rep.*, 47, 1: 1-25 (Jan. 1), 1932.

E. R. H.

**City Noise**—All interested in industry will be interested in this volume which is too extensive for abstracting. Among other features are: "What Noise Does To Us," Noise Measurement, Noiseless Progress, Practical Remedies and Finances. A number of interesting radio talks are also included, with papers by specialists.

The scale of noise levels ranges from a threshold intensity of 1—the least sound change heard by the normal ear—to 10 billion times that amount of noise representing a range from 0 to 100 decibels. A table makes clear the difference between loudness, as measured by the ear (decibels) and intensity, as measured by electrical instruments. A normal conversation, carried on at a distance of 5 feet, has a loudness of about 60 deci-

bels. A small difference in the loudness as expressed in decibels means a tremendous difference in the intensity involved.

A measurement of maximum noise levels from specific sources showed a passenger automobile (quiet) to produce 65 decibels, thunder (1 to 3 miles) 70, radio loud speaker 81, street car 83, roaring lion 87, motor truck 87, elevated train 91, subway 97, riveter 101, automobile horn 102, and hammering on steel plate (almost painful) 113.—Noise Abatement Commission, New York City, Department of Health, 308 pp., 1930.

E. R. H.

**Report of the Senior Medical Inspector of Factories**—The outstanding feature of the year has been the closer coöperation of the activities of the department with research work. It is recognized that the progress of industrial medicine as a scientific branch of medicine depends on the correlation of the study of conditions found in industry with laboratory observations.

Notifications of various occupational diseases are summarized in a table with comparison of figures for years from 1900 to 1930. In the latter year there were 265 cases of lead poisoning with 32 deaths, 3 of mercurial poisoning, 1 of arsenical poisoning, and 24 of aniline poisoning, 43 anthrax cases with 6 deaths, 194 cancerous cases (epitheliomatous ulceration) due to pitch, tar, and oil including 36 deaths, and 95 cases of chrome ulceration, most of which occurred in chromium plating although there were 15 reported in dyeing and finishing.

In connection with paint spraying the opinion was expressed that it was not necessary for efficient work to produce such quantities of air and paint as to produce a visible cloud. The amount of spray produced appears to depend on the adjustment of air and point delivery from the "gun" and the differences in density of the cloud are remarkable.

Among the anilin poisoning cases were 10 following the inhalation of vapor from 5-chlor-ortho-toluidine, the first thus far recorded. Within a day the workers reported slight headache, drowsiness and eye and throat irritation. Later serious effects were observed which caused 10 men out of 13 to cease work suffering from painful urination with bloody urine.

A table is given for the anthrax cases showing the locality, age, sex, occupation, severity, situation on the body, the material handled, the treatments, and remarks. Of the cases, 24 were incurred by handling hides and skin, 13 from wool, 1 from horse hair, and 5 in other industries.

There were reported 789 cases of dermatitis. This affliction has been steadily mounting in the last 5 years. It is considered that dermatitis can and must be reduced to a handful of cases yearly, but this can be accomplished only by carrying out to the letter the advice in the official pamphlets and placards. A large number of cases is due to the method of cleansing the hands and arms after work which could be largely prevented by coating the skin preliminary to work with a fine film of ointment which will prevent the entrance of stains. In many cases injury of some type preceded the dermatitis while in many others "dermatitis succeeded sepsis."

According to the registrar files, there were 700 certificates of deaths due to pulmonary fibrosis of which number silicosis was mentioned as a cause in 241 which occurred in the following industries in 1930—pottery 52, sandstone 49, coal mining 39, grinding 36, gold mining 23, refractories 12, sand blasting 10, tin mining 10, lead mining 2, granite 2, mining engineering 2, scouring powders 1, slate quarrying 1, file cutting 1, and leather dressing 1.

There were 20 fatal cases of asbestosis without tuberculosis, in 18 of which

a post-mortem examination was made. Of these 20 cases, 6 were mattress makers and 6 were carders or cloth weavers. The average age of death of these 20 cases was 38.9 years, and the average length of employment was 14.9 years. Despite the technical difficulties encountered in suppressing the dust in certain processes, it is believed that prevention of the disease is possible.

There were 133 case reports involving fumes and gases, 17 of which were fatal. Of these 94 were due to carbon monoxide, 2 to carbon dioxide, 5 to sulphuretted hydrogen, 4 to sulphur dioxide, 5 to chlorine, 5 to nitrous fumes and 6 to benzol (one of the latter being fatal). Artificial silk works among others were involved in both sulphuretted hydrogen and chlorine poisoning.

At a large aircraft works women were employed spraying cellulose paint on metal framework in a large shop ventilated as a modern dope shop by frequent changes of air. One of three women examined showed the presence of punctate basophilia of some considerable degree, together with epistaxis.

The effects of a cellulose paint said to contain 15 per cent benzol, sprayed by women in cabinets with localized exhaust, were studied clinically and hematologically, with the result that the only almost constant finding was faucial congestion, and this was not confined to those on spraying operations. No constitutional symptoms or results suggestive of benzol (or homologues) absorption were recorded. A more detailed examination seems to endorse the previously expressed opinion that with a moderate temperature and good localized exhaust ventilation, cellulose spraying has not affected the health of such workers. In a few cases where there has been complaint, a rapid improvement was noted with betterment of ventilation and a lower temperature. The occurrence of complaints bears a definite relation to conditions of work, but not to the percentage of benzol (or homologues) contained in the material sprayed.—

John C. Bridge, Senior Medical Inspector of Factories, *Ann. Rep. for the Year 1930*, pp. 94-122.

E. R. H.



# FOOD AND NUTRITION

## The Reserves of Vitamins A and D in Some Cartilaginous Fish—

It has been stated for some time that certain liver oils of cartilaginous fish are antirachitic, particularly the liver oil of the ray. There is, of course, the consideration that cartilaginous fish are naturally rachitic, when comparisons are made between the calcification and the phosphate content of these fish with the bony fish, although in America, Bodanski and Bakwin did not find any difference in proportion of phosphate in the tissues of the two kinds of fish.

This investigation has been made on vitamins A and D in the liver oil of three varieties of cartilaginous fish: *Centrina vulpecula*, Rondelet, *Scymnus Lichia* Muller et Henlé, and *Raja batis* Linné. These oils prepared respectively in 1924, 1925, and 1926, showed marked differences in gravity, saponification values, iodine number, and fatty acids, also in unsaponifiable material.

White rats were used for the biological studies and the rachitic and growth values were compared with a good commercial cod liver oil prepared in 1928. Assuming a basis of 100 for the cod liver oil, the following values were obtained for vitamins A and D in these species:

	<i>Scymnus Lichia</i>	<i>Centrina vulpecula</i>	<i>Raja batis</i>
Vitamin A..	90	40	30
Vitamin D..	40	35	25

While a slight correction should possibly be made on account of their age, the antirachitic value of these oils is greater than that of one bony fish (*Merlucius Merluccius* Linné) examined previously. It appears that cartilaginous fish can store appreciable amounts of vitamins A and D in the

liver which does not have any influence on the skeleton.

Formation of some bony tissue in these fish such as teeth and dermal plates indicates that they are capable of elaborating some tissue with normal mineral content.—Amile Andre and Raoul Lecoq, *Compt. rend. Acad. d. sc.*, 194:912 (Mar. 7), 1932.

**The Vitamin D Content of Red Palm Oil**—The flesh or pericarp of the fruit of the oil palm, *Elaeis guineensis*, contains about 60 per cent, by weight, of red palm oil. This oil is known to be a good source of vitamin A. Four samples of red palm oil were tested for their vitamin potency on albino rats. The animals were fed Steenbock and Black's rachitogenic diets and the daily dose of oil necessary to prevent the occurrence of rickets at the end of 35 days was determined. The richest of the oils contained less than one-thirtieth as much vitamin D as cod liver oil. Red palm oil is considered a good source of vitamin A to use when it is desired to limit the quantity of vitamin D in the diet.—William John Dann, *Biochem. J.*, 26:151, 1932.

**Vitamin A and Carotene. IX. Notes on the Conversion of Carotene to Vitamin A in the Cow**—The author concludes:

1. Although the body fat of the cow is normally characterized by the presence of small amounts of carotene, vitamin A as such is present in preponderating amounts both in the liver- and milk-fats. Since the cow is purely herbivorous this finding suggests that carotene undergoes the conversion to vitamin A previously demonstrated in the rat.

2. This conclusion is supported by the finding that the feeding of carotene, in the form

evaporation. Milk is capable of adequately supplying this fraction for optimum growth.

The amount necessary, while lower than that required for the antineuritic factor, is also fairly large, that is 17 to

20 c.c. (2.37 to 2.78 gm. solids). The question of the identity of this heat-stable factor with the antipellagra fraction is still unsettled.—Leo. T. Samuels and Fred C. Koch, *J. Nutrition*, 5:307 (May), 1932.

## CHILD HYGIENE

### PALAMA SETTLEMENT

A UNIQUE combination of medical, dental, nursing, recreational, and health educational activities for children is to be found at Palama Settlement, located in the most congested district of Honolulu.

This institution had its beginning as a social center under church auspices in 1896. An extension of the services of the Palama Chapel took place in 1906, at which time its name was changed to Palama Settlement. A gymnasium and a swimming pool were added to the plant. Interest in the prevention of tuberculosis opened a vista for a broad public health program, in which prenatal and child welfare conferences were developed. Free dental clinics were established, and school nursing was initiated. In 1925 Palama Settlement moved into more commodious quarters, provided with recreation rooms, gymnasium, and swimming pool, an entire building for medical and nursing services, and a separate building for dental clinics made possible through the Strong foundation.

The demands upon the settlement became so great that in 1929 its direction was placed in the hands of a full-time public health administrator. Since then the work has been fully coördinated with all the health activities in the community. This has been especially helpful in the child health field. Dr. Philip Platt, the director, says:

Palama has become an aggressive leader in public health and preventive medicine. Efficiency of its medical and dental work now grown to some 68,000 services yearly has greatly increased. Standards of its public health nursing service have become notably high, and the contribution of the recreation department has been expanded many fold. Public health education, through the medium of its new Tuberculosis Committee, has taken forward strides. The more fundamental factors involved in the prevention of the ill health and economic misery of the family are promoted through a mothers' health clinic. Venereal disease is being vigorously combated. Participation on a score of committees has enlarged Palama's contribution to the community's welfare.

The Settlement as a voluntary agency stands ready as always to assist the official governmental agencies in the adequate performance of their tasks. It seeks to return to the Territorial Board of Health those activities which rightly belong to the official agency, such as the venereal disease clinic. It would gladly transfer its medical outpatient department to the Queen's Hospital, with its excellent in-patient department, believing that the best medical service to poor and the best training of a hospital staff can be had only when out-patient and in-patient departments are brought together as equal units of a hospital center. These developments, however, seem far distant.

The immediate future of Palama lies along the lines of preventive medicine, health education and youth upbuilding. The preventability of many communicable diseases, and the spreading of knowledge as to how to prevent disease and keep well, will be stressed with ever increasing emphasis. Not only tuberculosis, but mental hygiene, heart disease, and cancer control, the prevention of blindness, accidents, and venereal disease must

increasingly occupy the energies of Palama Settlement. Delinquency, because the boy or girl has no normal satisfying outlets in organized recreation or creative interests, will be aggressively combated as they have in the past.

Every summer 60 boys, then 60 girls, spend 4 weeks each at Palama's Fresh Air Camp on windward Oahu. Total weight gained last year: 288 pounds; 5 times the normal gain per child.

#### PALAMA'S RECREATION ACTIVITIES

- 2,096 full memberships
- 2,234 use the children's playground
- 40 Palama and Community Clubs
- 26 leagues, 181 teams, 2,352 players
- 65 other teams played at Palama
- 1,161 physical examinations
- 1,997 children given physical education instruction during school hours
- 1,030 given swimming instruction
- 56 Juvenile Court boys supervised
- 2,644 used Recreation Camp at Waiialua.

In Honolulu a joint nursing service is maintained by Palama Settlement and the local Board of Health. A generalized nursing program is carried out effectively in 25 nursing districts. In 1931 the public health nurses assisted in the health examination of 5,701 school children and gave 833 group inspections and 18,903 routine treatments.

Palama's \$200,000 budget brings medical, dental, nursing, recreation, and health education to more than 50,000 individuals. City appropriations, Chamber of Commerce donations, United Welfare Fund contributions, private foundation funds and institutional receipts balance the budget. Health education is Palama's corner stone.—

*The Story of Palama Settlement, The Friend*, Apr., 1932, Honolulu, Hawaii.

#### Summer in Child Health Work—

The summer season offers an exceptional opportunity to strengthen and extend health work among children. Summer should be conducive to better health conditions. This is the season of lowest mortality in childhood, as a result of the intensive public health efforts of the last 25 years. It may, however, be

a time when latent defects manifest themselves and when the children are exposed to accidents and certain of the infections easily disseminated in camp life.

The opening of playgrounds, summer camps, and vacation centers gives the health authorities a chance to check on their sanitary conditions and to raise standards. For this purpose it is very helpful to create summer camp councils in the large cities. Some cities have devised score cards for camps, which have been placed in the hands of the camp director so that each item may be checked. This may then be evaluated by the local health department. The Cleveland Camp Council has used such a card with good effect for several years. The items appearing on this score card for camps are as follows:

#### SCORE CARD FOR CAMPS

##### *Health Standards:*

- Resident doctor or nurse
- Physical examination of all child campers
- Physical examination of camp staff
- Physical examination of food handlers, including Wassermann and typhoid test
- Hand washing always practised after leaving latrines, especially by food handlers
- Every child in camp vaccinated
- Counsellors refer to children's health cards in supervising activities
- Daily health inspection of children at camp
- Fresh vegetables and fruits served every day
- Milk served three times every day
- Individual drinking cups and towels for all
- Fly control in kitchen or dining room
- Mosquito control methods followed

##### *Safety Standards:*

- Water for drinking, washing, and cooking analyzed by city health department before opening of camp and every 2 weeks afterward
- Water used for swimming also analyzed by city before and during camp
- Use only Class I pasteurized milk, approved by city
- Safe refrigeration for perishable foods and milk
- Garbage kept in covered cans and disposed of daily

Swimming only under supervision of Red Cross examiner  
 "Buddy" system in force during swims  
 Life-savers have thorough knowledge of prone pressure method of artificial respiration  
 Swimming periods never sooner than 2 hours after meal  
 Boats safe and never overloaded  
 Immediate isolation of sickness cases—contagious or otherwise serious

*Equipment Standards:*

Well equipped dispensary for caring for injuries  
 Special room or tent equipped for isolation cases  
 Sanitary latrines and safe sewage disposal  
 Convenient hand washing facilities near latrines  
 Proper equipment to facilitate washing before each meal  
 Equipment for children to have one warm bath with soap weekly  
 Comfortable dining room with shelter against bad weather  
 Hot water and sanitary drying facilities for dishes  
 Adequate fire fighting equipment: extinguishers, pails, ropes, ladders, and hose  
 Comfortable sleeping quarters with adequate protection against weather  
 Single cots with clean mattress and bedding, and at least 24 feet of space for each camper.

Another opportunity for health work among children is the summer play schools which have been established as parts of teacher-training institutions. In these schools, medical examinations, health inspections, and a considerable amount of health education can be carried out through the daily routine. It is always possible to use the lunch period as a time in which to develop proper attitudes toward food, as well as the suitable selection of food. The parents themselves usually take a great interest in the play schools; accordingly, a coöperative arrangement can be established with the home.

A very successful summer health school program has been carried out by the Los Angeles County Health Department for several years. During this summer they will promote this project in coöperation with the summer session of the University of California at Los Angeles. Two informative articles have appeared recently in *Hygeia* outlining the practical aspects of coördinating the health activities of the summer play schools.—Summer Play Schools, *Hygeia*, 10, 6:555-558 (June), 1932.

## PUBLIC HEALTH NURSING\*

**The Canadians Survey Their Nursing Situation**—The united forces of the Canadian Medical Association and the Canadian Nurses' Association have during the past 2 years been making a study of the nursing situation in Canada which will probably lead to the revolution of the system of nurse education and the organization of nursing services in that country.

The Survey Committee consisted of 3 prominent physicians and 3 prominent nurses, and the director was Dr. A. M. Wier, Head of the Department of Education, University of British Columbia.

A 581-page report has been published rather as the beginning for thought and action on the part of physicians, nurses, and the general public than as the conclusion of the matter. Provincial and national associations are already studying the facts presented by the survey with so much interest that the committee is confident that when a later survey is made a much happier nursing situation will be found.

A quotation from the report:

The evidence of the survey is conclusive on many points. Among these are that schools for nurses are not financed and organized as schools; the selection of students, their number, the curriculum and the teaching methods are not governed by public needs; the so-called schools are graduating nurses in too large numbers for resident service in homes and hospitals rather than for the developing public health services which are crippled by a shortage of qualified nurses; some system differing from the present one of direct payment by the patient must be created to provide essential nursing care in illness as well as in health.

When one studies the information on personal backgrounds, intelligence quo-

tients, training, employment, salaries, and personal satisfactions in jobs revealed in this report, it is not difficult to understand why the public and the medical and nursing professions are dissatisfied with the nurses' place in the national life of Canada.

The questionnaires returned by 1,475 doctors showed that while there was a 34 per cent surplus of graduate nurses, there was an actual shortage of public health nurses. The Survey Committee suggested that an increase of 20 per cent in the number of public health nurses in Canada generally, and 40 per cent in the Maritime Provinces would mean an excellent investment of money. The committee recommended, however, that public health nurses must be carefully selected and trained to succeed, and proper coördination of their services to prevent overlapping should also be maintained.—Eunice H. Dyke, *The Survey of Nursing Education in Canada*, *Canad. Pub. Health J.*, XXIII, 4:195-197 (Apr.), 1932.

**Public Health Nursing in New York State**—The Division of Public Health Nursing of the New York State Department of Health was created by legislative act in 1913. In that year there were 135 public health nurses in upstate New York; now there are approximately 1,500. While these nurses may be called visiting nurses, school nurses, tuberculosis nurses, child hygiene nurses, etc., they are all classified as public health nurses.

The present staff of the division of public health nursing of the State Health Department consists of "a director, an assistant director, an extension secretary, with an assistant, in

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

charge of special training courses for nurses; an office and visiting nurse; 14 district supervisors, responsible to the division for standards and procedures and to their respective district state health officers for development of the local public health nursing program; and about 60 other public health nurses who work in the field to promote the interests of various divisions of the department."

The State Education Department now employs 2 state-wide supervisors of school nursing appointed from a civil service list.

Of the 1,500 public health nurses working in upstate New York about 60 per cent are paid entirely from public funds: 583 are paid by private or voluntary agencies, and about 200 more are supported partly by official and partly by unofficial agencies.

After getting this birdseye view of public health nursing in the state the following recommendations of the New York State Health Commission take on new interest:

That as there are developed through the state, county health departments, each with an adequate staff of public health nurses, a qualified supervising nurse be placed in each unit under the direction of the county health commissioner, who shall (a) be responsible for the work of staff nurses; (b) serve in an advisory capacity to and coördinate the work of all public health nurses in the county.

That the State Department of Health be given authority to develop a better qualified public health nursing personnel in the state through:

- a. Enforcement of qualifications outlined by the Public Health Council
- b. Extension of supervisory and advisory service to local nurses and services where local supervision is found to be inadequate
- c. Provision for more specialized supervision in mental hygiene, social hygiene, social service and nutrition
- d. Extension of the present program of staff education

That greater coördination of school nursing with the general nursing services of the state be developed through more adequate super-

vision of full- and part-time school nursing, and that additional school nursing be provided, particularly in rural and village areas.

That the State Department of Health endeavor to develop local public health nursing services on a county unit basis providing for:

- a. A state-wide program of generalized nursing, to include rural school nursing
- b. Competent county supervision
- c. State supervisory and consultant service where local supervision is inadequate and does not follow accepted standards of supervision

That the State Department of Health make a concerted effort to promote local public interest through community activities which tend to advance county nursing programs.

That the nursing staff of the State Department of Health be reorganized, reallocated and classified as general district supervisory nurses, consultant specializing nurses and field nurses, and that suitable qualifications be required and salaries paid commensurate with the duties of such positions.

That the Public Health Council increase the present required qualifications of public health nurses, both as to preliminary education and postgraduate training.—

Public Health Nursing in New York State, Reprint from the *Report of the New York State Health Commission*, 1932.

**Requirements for Effective Work in Mental Hygiene**—Mental hygiene is interested in insanity and mental defectiveness, in stimulating psychiatric research, and in promoting a healthy public attitude toward these afflictions. It is interested in twists and distortions of personality, behavior problems, and in the establishment of all kinds of clinics for their effective treatment. But mental hygiene must be broader than this even, and interest itself in the general enrichment of life for all.

People who come in close contact with their fellow men, particularly if they have some responsibility for their direction, like public health nurses, for instance, and social and court workers, are in the best position to help achieve these aims of mental hygiene. Misfit in this field, however, are not to

tolerated, and there are some requirements if one is to do effective work.

First one must have such a love for human nature that she will be fascinated by the study of its operations, and will want to gain an understanding of the individual so that she can be guide, philosopher, and friend. A public health nurse who wishes to do real mental hygiene work should constantly be asking herself about her clients: "What are the reasons lying back of this behavior? What are the cravings of this man's soul, and how is he satisfying them? Would I not act in exactly the same way if I were exposed to the same environment and had the same mental equipment, the same mental assets and liabilities?"

Then one has to be a student of human nature. There are two ways of gaining knowledge in this field: one is through books (three recommended are Strecker and Appel's *Discovering Ourselves*; Grove and Blanchard's *Mental Hygiene*; and Carl Menninger's *The Human Mind*), discussions, and lectures. The other way is through continual study of people. Be familiar with these phenomena of the unconscious mind: repression, sublimation, rationalization, etc. Remember that we cannot explain behavior, whether conscious or unconscious, particularly if it is complex, unless we go beneath the surface and study the subconscious motivations.

Be familiar with the departures from mental health. Know what the criteria for mental health are. Know when a person is slipping. One way is to observe how an individual satisfies his ego hunger, how he submerges his own self interests in community interests, the way in which he faces the facts of life, including himself. One unhealthy way of satisfying ego hunger is by antisocial conduct; another is by thrusting oneself forward through self

deception and delusions of importance when one fails to secure recognition through merit and achievement; another way is ruthlessly to dominate, not one's equals, but those in the home, the office, the factory, the store, who, because of their positions, cannot avoid the domination. "It is always unhealthy to dominate unless domination springs from superior ability and better background."

A healthy way to satisfy ego hunger is to project oneself into work and be satisfied if it wins approval.

With adults we can study motivations directly, but with children who have not yet reached the philosophic stage we must study the environment and the influences that affect their growth—their home, their school, their playground, their mother and father.

It is very important for mental hygiene workers to study themselves first of all, to become their own patterns of reaction. This will keep them from "high-hatting their clients," for as soon as the social worker has evaluated herself she becomes common clay with the whole group, and will find that she can take a lesson from the prostitute or thief.

Another suggestion is to sit in on the conferences in your mental health clinics and gain an insight into the work from the psychiatrists and psychologists. A mental health clinic that does not energize a whole community of nurses, social workers or physicians is not worth the money put into it.

One person who has a real insight into mental hygiene and can use it to improve the mental health of all around her is worth her weight in gold. The one priceless thing is personality.—C. M. Hincks, M.D., *Requirements for Effective Work in Mental Hygiene, Indiana Bull. of Charities and Correction*, 203:213-218 (Mar.), 1932.

## EDUCATION AND PUBLICITY\*

Health Education Institute, October, 1932—The first Institute on Health Education to be conducted by the Public Health Education Section will be held at Hotel Willard, Washington, D. C., October 22-24, 1932, immediately preceding the annual meeting of the A.P.H.A. which opens Monday, October 24. The official announcement says:

The purpose of the Institute is to provide instruction in the content and methodology of health education to a limited number of persons actively engaged in health education.

The students whom it is desired to attract to the Institute, may or may not have had training in health education in one or the other of the very few institutions where it is available. They may have had a little or considerable experience. They may devote all their time to this work or it may be merely one of several activities. In any event, health education is for them a major preoccupation and they must from time to time formulate programs of activities in health education and carry them through.

At the Annual Meetings of the American Public Health Association there gather a large number of experienced individuals from various divisions of the public health field. The Health Education Institute is scheduled in connection with the Annual Meeting so that advantage may be taken of their presence.

The staff of the Institute is as follows:

Iago Galdston, M.D., Director, Medical Information Bureau, Academy of Medicine, New York, N. Y.

Bertrand Brown, Milbank Memorial Fund, New York, N. Y.

Ewart G. Routzahn, Russell Sage Foundation, New York, N. Y.

Mary Swain Routzahn, Russell Sage Foundation, New York, N. Y.

Clara E. Turner, Massachusetts Institute of Technology, Cambridge, Mass.

\*There will be a supply of samples of printed material and of other things which concern health education, to be distributed at the Institute, 115 East 22d St., New York, N. Y.

W. W. Peter, M.D., Cleanliness Institute, New York, N. Y.

Ira V. Hiscock, Yale University, New Haven, Conn.

H. E. Kleinschmidt, M.D., National Tuberculosis Association, New York, N. Y.

George C. Ruhland, M.D., Commissioner of Health, Syracuse, N. Y.

W. W. Bauer, M.D., American Medical Association, Chicago, Ill.

Frank J. Osborne, Health Officer, East Orange, N. J.

Raymond S. Patterson, John Hancock Mutual Life Insurance Co., Boston, Mass.

Active health education workers in official departments of health—state, county and city—and in voluntary agencies are invited to enroll.

Health officers and directors of health organizations are urged to send to the Institute the individuals responsible for health education activities in their units.

Application for enrollment in the Institute should be made on the prescribed form attached to this prospectus.

The registration fee is \$5.00 and must accompany application. Payment of the fee entitles the student to all the privileges of the Institute and to private consultation with the instructors, if desired. Students, whether or not they are members of the American Public Health Association, will enjoy the special railroad rate of three-quarters of the regular round-trip fare.

Mail checks and applications to: American Public Health Association, 450 Seventh Ave., New York, N. Y.

### WHAT IS THE PROGRAM OF THE INSTITUTE?

Saturday, October 22, 9 A.M.-12:00 *Health Education Instruments*: Discussion of the instruments employed in Health Education: pamphlets, weekly and monthly publications and bulletins, charts, posters, health talks and radio talks; their special utility and their limitations. Discussion leader: Ewart G. Routzahn. Discussers: Bertrand Brown, W. W. Peter.

Saturday, October 22, 2:00 P.M.-5 P.M. *Sources of Information*: The responsibility of the health educator for the authenticity of his material. How to go about securing de-



pendable information to present on the items selected, to the indicated audiences, and through the preferred media. Tapping authoritative sources. The coöperation of the medical profession. Discussion leader: Ira V. Hiscock. Discussor: Clair E. Turner.

Sunday, October 23, 9:00 A.M.-12:00 *Building Programs*: How to formulate a program of health education suitable to the community. How to determine the allocation of staff, money and effort. This problem will be considered from the viewpoint of both the official agency, that is, the department of health, and of the voluntary agencies. Discussion leader: Frank J. Osborne. Discussers: Ira V. Hiscock, Raymond S. Patterson.

Monday, October 24, 9:00 A.M.-12:00 *Program Execution*: The avenues through which the program might be formulated: the population at large, special groups, schools, primary and secondary, teacher training organizations, work shops and work places, commercial organizations, etc. Discussion leaders: W. W. Bauer, George C. Ruhland, Evert G. Routzahn.

A question period will be arranged for at the end of each discussion, though the participants in the Institute will be privileged to interrupt the discussor with pertinent questions.

**We Make Mistakes**—We are so sure of it that all copy for this department of the JOURNAL is submitted in advance of publication to those who should know the facts. If we are slow in sending out the checking copy we discover an excess of errors too late for correction. Here are the latest examples:

Eastman Kodak Company wish you to understand that any Dr. Haggard talks mentioned in this department are out of print. Only copies of talks yet to be issued can be supplied upon request.

Committee on the Costs of Medical Care wishes it to be understood that among their *free* publications are abstracts only of the larger, fuller reports published by the University of Chicago Press.

*Infants' and Children's Department* is published at 1 E. 35 St., New York. This is the trade journal interested in

"baby weeks" and other health services offered by department stores.

B. R. Rickards of New York State Dept. of Health reports that the Wednesday broadcasts of the department are at 6:25 E.D.S.T. over WGY.

American Child Health Assn. wishes me to emphasize that the bibliographies and other publications mentioned as *free* are supplied thus only as single copies. Quantities for a school or association are sold at low rates.

Also the *Emergency Nutrition Special* and the *Child Health Bulletin* mentioned under "Depression" are out of print. The valuable statement by Dr. Sherman has been reprinted. *3 cents for single copies.* Address at 450 7th Ave., New York.

Dr. Huntington Williams of the Baltimore Health Department emphasizes the pitfalls in editorial condensation:

The weekly health talks are broadcast under the joint auspices of the Baltimore City Health Department and the Medical and Chirurgical Faculty of Maryland and are given over Station WBAL each Tuesday at 6:15 P.M. Beginning April 26 the talks will be at 5:15 P.M. or 6:15 P.M. daylight saving time.

**Come to Washington to Learn**—Some of the attractions at the October, 1932, meeting of the A.P.H.A. are set forth most eloquently by Program Chairman Raymond S. Patterson:

The clinic will be the method employed once more by the Health Education Section at the Washington Annual Meeting. A "clinic" has to be attended for the method does not lend itself to successful reporting. You can't *read* about the operation and its successful outcome, you must be present to *see* it.

There will be another old fashioned clinic on printed matter! S.R.O. (standing room only—to you). Brain children of several proud health workers will be subjected to treatment guaranteed to make the antivivisectionist's flesh creep. Dr. Klein-schmidt will be the cruel fiend in human form who will do most of the dissecting.

The very best in health broadcasts will come

to you "over the air"—offerings by Haggard, Bauer, Rice, *et al.* Then the critics will be merciless. You will leave that clinic cautious about rushing into that inviting field where angels fear to tread.

There will be more meetings, too, at which other health propaganda methods will be taken apart to "see what makes it tick." But these are reasons enough why you must plan now to come to Washington to learn.

#### "Health Plays for School Use"—

This is the title of a 4-page mimeographed pamphlet, with annotated lists of plays and books on the technic of expression. American Child Health Assn., 450 7th Ave., New York. *Single copy free.* From the introductory paragraphs we quote:

It is important, if the richness and depths of a child's imagination and emotional nature are to be permitted free expression in the interest of learning, that the lesson in play form be not only truly imaginative, but also that its factual content ring true, and that the action have, inherent in it, real dramatic possibilities.

In selecting the health plays here listed, an effort has been made to choose those most naturally childlike, most naturally dramatic.

Teachers should remember, however, that the richest vein of dramatic possibilities for learning always lies in the child himself—especially in the little child. His original dramatic expression, in words and action, of an idea that is clearly presented to him and that has become thoroughly familiar, will always have greater educational value than any dramatic activity prearranged for him by others.

**Broadcasting By Voluntary Organizations**—The United States Office of Education is collaborating with the National Advisory Council on Radio in Education in making a survey of the present and contemplated uses of radio broadcasting by voluntary organizations. The principal purpose of this study will be to make available present plans and practices as a means of promoting mutually helpful relations between broadcasting agencies and organizations with public service objectives.

All state and local associations making use of radio or planning to do so are invited to ask the Office of Education, Washington, for the report blank which contains but 5 questions to be answered.

#### The Health Evaluation of Advertising—A recent letter from a public school director of physical education:

I am giving a lecture to a group of elementary teachers on "The Evaluation of Health Through Advertising" and I would appreciate the fact if you could give me some help. The gist of the subject is to evaluate statements made by people who are advertising health products.

This request brought a variety of interesting information and suggestions. What interested me most were two lesson outlines from Mary P. Connolly, Detroit Department of Health, on "Evaluating Health Information" and "Patent Medicines." Each presented "Aim," "Subject Matter" and "Procedure." The "Aim" of the first lesson:

To develop ability to judge health information intelligently.

To develop an intelligently critical attitude toward health advice.

To realize the folly of believing in health racketeers.

What can be taught to adults and young people as to discrimination in favor of sound and against unsound advice?

**What You Would Like to See at Washington**—What kinds of health education materials and helps would you like to see at the Washington meeting of the A.P.H.A.?

Have you any contributions? Any ideas? Any desires?

We had collections of the following at Montreal: Summer warnings and advice, Winter warnings and advice, Health examinations, Diet and weight, Diphtheria, Cancer, Rural sanitation, Colds, and Children and schools.

Will you select the best on those topics you have ever issued and send, to bring the collections up to date?

Please select the better examples from all types of publicity and health educational material you have ever issued and send for a special display? Address: Washington Display, Evart G. Routzahn, Russell Sage Foundation, 130 East 22d St., New York.

#### A Suggestion and a Request—

That (1) so far as possible pamphlets which are sold shall carry the price (preferably on the cover page), and (2) that copies of pamphlets, reprints, reports and other material sent to editors and those who make up reference lists for publication be accompanied by a memorandum stating whether or not copies are available—free, for a specified amount of postage, or for a set price. A few correspondents follow this very helpful practice. Then neither editor nor reader need guess—or write extra letters of inquiry.

It is important in sending pamphlets and research reports to *Publishers' Weekly* that the price be noted on the front cover. Otherwise they will add "apply," which reduces the number of inquiries or makes extra correspondence necessary.

Don't "Condescend" to Your Audience—Evidently Heywood Broun has not seen all of the good writing that is being done on health topics. But there is enough of the other kind to warrant our quoting several paragraphs from the *New York World-Telegram* (June 4, 1932). We may wish to check up on what we say or write.

The New York Academy of Medicine gave a dinner the other night to the newspaper men, and we all made speeches. First, some doctor would get up to say how much he admired the standards and ethics of journalism, and then a reporter would reply by laying it on pretty thick about the physicians. I was not quite in accord with the spirit

of the evening, for it seems to me that the efforts to make your liver and mine good feature copy have not been altogether happy up till now. I used to be among those who urged the members of the medical profession to abandon their secrecy and come out into the open to tell us what they were all about. But by now I have begun to lean back to the old Victorian tradition of reticence for healers.

It is not impossible to present scientific subjects in a popular and accurate form, but at least it is difficult. And when a doctor begins to write for newspapers or magazines of general circulation he has a tendency to go James M. Barrie on his public. I wish these missionaries to the laymen would not condescend so confoundedly. I would much prefer to know nothing at all about my heart than have it told to me in the form of a bedtime story.

#### When Speaking About Cancer—

*Cancer Compend: A Handbook for Speakers*, by R. V. Brokaw, M.D., American Society for the Control of Cancer, 25 West 43d St., New York. 44 pp. Free. Includes: "Approach to the Subject," "Important Facts," "Special Questions," "Statistics," "Bibliography." It is dated. The bibliography gives number of pages, address and price of each book.

So much of the "Approach to the Subject" has a general bearing on the presentation of health topics that we quote it in full.

Public speaking ability is fundamental in the successful presentation of any subject to any audience. No amount of knowledge can compensate for the lack of clear thought and precise statement under such circumstances.

The acceptable presentation of a public lecture on cancer is especially difficult because of the extensiveness of the field, the complexity of the problem, the gravity of the situation and the prevalent dread of the disease.

Conceding the possession of fundamental facts by the speaker, the method of presentation is important. The talk should by all means be adapted to the audience. The style of delivery suitable for the women's club, for instance, will not do for a radio broadcast. Non-technical language should always be employed. Brevity in the more formal part of the talk is preferable. An opportunity to

ask questions is generally appreciated; and the resulting discussion is often the most profitable feature of the meeting.

Experience has demonstrated that the following admonitions may well be heeded:

It is not wise to underestimate the experience of your audience. They may not be familiar with your specialty, but in some fields they may excel you.

One should not assume an *ex cathedra* attitude in presenting his subject. Judgment is never infallible; there are no unalterable conclusions; and most people are quick to resent an undue manifestation of authority.

Sentimentality should be avoided. An emotional appeal rarely produces any lasting convictions or stimulates any effective action.

Exaggerated statements are unnecessary. The exact truth about cancer is sufficiently hopeful, and sufficiently hopeless, to satisfy any degree of optimism or pessimism.

The pessimistic aspect of the cancer situation should not be emphasized. Pessimism is strongly conducive to paralysis; and that in cancer is most unfortunate.

Statistics should not be presented without a reasonable degree of certainty as to their accuracy and source. Absolute accuracy in quoting individuals is very important.

Critical comments regarding differences of opinion or of practice among physicians may profitably be omitted. Desirable results are not obtained by the creation of distrust.

The direction of attention to your own ability is likely to be embarrassing. Your audience will question your motive; and your colleagues will resent the inference.

An exhibition of prejudice regarding the treatment of cancer is unwarranted. Surgery, X-rays and radium are equally effective in their respective fields.

The recital of the details of surgical operations and of similar procedures is very undesirable. Such descriptions create fear and serve no useful purpose.

**"Discrimination In Health Teaching"**—An address on this subject by W. P. Shepard, M.D., has this "Conclusion":

Thus I have attempted to show that the rapid development of the school health program, its worthwhileness, its inspiration and its large rewards, taken together with the comparative infancy of the public health movement, have combined, first, to create a very fine liaison between the teaching and medical professions, and second, a rather insistent demand by the teachers for more

facts and more results from the doctors. This pressure might conceivably result in misunderstanding between the professions with resultant loss of confidence by teachers in the whole health movement. This is a catastrophe which can be prevented if foreseen. Public health men and physicians are gradually understanding more clearly what the teacher wants and the importance of coöperation. We realize that only by having children taught health facts and how to apply these facts can we hope to put the discoveries of preventive medicine to their best use—the prolongation of life. This can only be done when the teacher appreciates her responsibility to exercise a fine discrimination in selecting the content of her courses. And such discrimination can only be effective when the teacher understands something of the scientific approach and method, the pitfalls of fallacious reasoning, the limitations of science, and the necessity of selecting her authorities carefully.

A paper to be added to the library of the health educator whether working among adults or children.—Reprint from *California Quarterly of Secondary Education*, Berkeley. Apr., 1932. Apply to the author, 600 Stockton St., San Francisco, Calif., or Metropolitan Life Insurance Co., New York. *Free*.

**Mental Hygiene for the Public**—"Future Public Education in Mental Hygiene," by Sanger Brown, II, in *Am. J. Psychiat.* (Jan., 1932), and *Psychiat. Quarterly* (Jan., 1932), favors widespread public education.

Dr. Brown's article deals with the possibilities of public education in the promotion of mental health on a basis analogous to the widespread educational work in those fields of public health that deal with the human body. He states that "the time is fast approaching when public education in mental hygiene will take on the importance and significance of the campaign against tuberculosis, cancer and other widespread physical disorders."

Further he continues, "While many people are already well informed on the subject, education in mental hygiene for the great mass of people is practically virgin soil. Through the processes of an educational campaign the important facts of mental hygiene will gradually filter through from the more enlightened to the less informed and will eventually reach the average man."

"While a good deal of the material of mental hygiene is theoretical and there are some controversial subjects which should be avoided, a great deal that is definite and clear has already been learned with reference to the nature, the causes, the treatment and prevention of mental diseases, and there are certain essentials of this knowledge which should be communicated to the public. The commoner forms of mental adjustments and conflicts which so many persons experience should be made clear. Such conditions, for example, as anxiety states, fears, depressions, emotional instability, mental exhaustion, irritability, extreme sensitiveness, undue aversions, and innumerable other minor mental ills are suitable subjects for public education."—Paul Komora.

## NEW

*The Health Bulletin*, Bureau of Health, Knoxville, Tenn.

*Mental Health Observer*, Missouri Society for Mental Hygiene, 613 Locust St., St. Louis.

*News-Letter*, American Assn. of Psychiatric Social Workers, 41 East 47th St., New York. Now a printed bulletin. \$1.00 a year.

New in its smaller page, and in being printed in large type on dull-finish paper, is *Birmingham's Health*, Jefferson County Board of Health, Birmingham, Ala.

## MAGAZINE ARTICLES

"Hay Fever and Sensitivity," by Morris Fishbein, M.D. *Saturday Evening Post*. May 21, 1932. Includes heredity's effect, hay fever calendar, effect of humidity.

"Keep a Health Diary," by C. Ward Crampton, M.D.; "Dry Skin and Oily," by H. R. Cades. *American Girl*, 670 Lexington Ave., New York. May, 1932. 15 cents.

"The Risks of Childbirth," by Louis I. Dublin. *Forum*. May, 1932. Reprint from Metropolitan Life Insurance Co., New York. Free.

"Take Your Medicine," by R. F. Wadsworth, M.D. *Collier's*. May 28,

1932. "There's a lot in a point of view," "symptoms are catching."

## ON THE JOB

A. W. Jones of the St. Louis Tuberculosis Society is now also secretary of the Missouri Society for Mental Hygiene.

Claude E. Towner, of Monongahela, Pa., formerly editor of the *Monongahela Daily Republican*, and a former member of the legislature, was recently appointed news director of the Pennsylvania State Dept. of Health. Mr. Towner will write for the newspapers about department activities. The weekly syndicated health and dental talks will continue to be prepared by the Bureau of Public Health Education.

## MOTION PICTURES

The Red Cross picture, "The Symbol of Mercy," has been reproduced in 16mm film for use on portable sound projectors.

An enthusiastic review of "Arrow-smith" as a movie appeared in *Everybody's Health*, St. Paul, March, 1932. "Arrowsmith Shows Thrilling Adventures of Medical Heroes." We have heard that the motion picture version of the novel is free of some elements objectionable to the medical profession.

"Why Willie Was Willing to Wash." National Motion Pictures Co., Indianapolis. "The story of a very dirty little boy who becomes willing to get familiar with soap and water only after he has been vividly shown the extreme importance of cleanliness to himself." 1,000 feet. 15 minutes. Also in 16mm at less than half the cost of 35mm.

## HOW IT IS DONE

"Mark Time" and "Ben Hustler" give some good advice to inspectors of roadside eating places. *Public Health News*, New Jersey Dept. of Health. April, 1932.

"Investment," a "weekly health message" of the Iowa State Dept. of Health, is a half-dozen paragraphs urging the worthwhileness of health activities.

Several appreciative letters from former patients are published in the 1931 report of the Saturday Hospital Society, Leicester, England.

"Child Health Teaching" was presented in a round table conference of State Tuberculosis and Public Health Committee, S.C.A.A., New York. The participants included 11 speakers, a chairman, a secretary, a staff assistant and two consultants.

Something of the variety and extent of "education and publicity" possible in a specialized field is revealed in the annual report of the Chicago Heart Assn., as noted in its *Bulletin*, 203 N. Wabash Ave., Jan.-June, 1932.

"Health Education" heads 10 references in "Bibliography on Education of the Negro," by Office of Education, Washington, covering Jan., 1928, to Dec., 1930. If ordered from Supt. of Documents send 10 cents.

"Carrying Forward a Nation-Wide Service," a booklet of National Organization for Public Health Nursing (450 7th Ave., New York) is an effective, straightforward statement of the field and the activities of the association. *Free.*

New posters are announced and local campaigns of education reported in *Occasional Bulletin*, Health and Cleanliness Council, 5 Tavistock Sq., London, W.C.1, England.

A large circle, "Analysis of Each Dollar Spent by Imperial County" makes very striking the excessive modesty of the county's health budget. In *Imperial County's Health*, mimeographed bulletin of County Health Dept., El Centro, Calif.

For the best editorials on the Christmas seal cash prizes amounting to

\$125.00 were awarded by the Ohio Public Health Assn., Columbus. For best editorial in a daily: to G. J. Kochenderfer, Mansfield *Journal*. For best editorial in a weekly: to W. O. Markham, Mineral City *Promoter*; for second best: to G. A. Kikendall, Cuyahoga Falls *Reporter*.

"Dental Hygiene" is the central theme for the Jan.-Feb., 1932, issue of *Commonhealth*, Massachusetts Dept. of Public Health. On 41 pages appear 23 short articles—problems, projects, experiences. Information as to addresses and prices for securing educational materials and professional reading is lacking in some cases. Likewise in the general "Book Notes" no price is given for the title likely to interest more readers than the two books which are priced. Two letters are necessary to order that book.

#### USING THE MIMEOGRAPH

A printed heading for top of first page is used for the mimeographed *Bulletin*, Bexar County Public Health Assn., San Antonio, Tex.

A mimeographed front page on heavy tinted paper gives distinction to the monthly *News Letter*, Michigan Public Health Assn., Lansing. The other pages are on ordinary mimeograph paper.

Orange bond paper, with printed heading and tail-piece, makes it easy to recognize the monthly issues of *News Letter* of Dutchess County Health Assn., Poughkeepsie, N. Y.

A letter-size, mimeographed sheet invited the "neighbors" of Maternity Center Assn. of Brooklyn to a baby "fashion show," plus an exhibit, a playlet and a cup of tea. Paper cost \$.59; 500 envelopes, \$2.00; postage, \$10.00; mimeographing done in the office; illustrations "sketched by young art student"; envelopes addressed by volunteers; total cost, \$12.59. A few copies *free*. Address: 42 Livingston St.

## BOOKS AND REPORTS

**Human Physiology**—By Percy Goldthwait Stiles. Philadelphia: Saunders, 1932. 448 pp. Price, \$2.25.

The sixth edition of Dr. Stiles' book meets the need of the high school and college student admirably. In the lower grades the student learns health precepts and rules. With adolescence comes an inquiring skepticism and a challenge of accepted beliefs. He begins to think thoughts of his own and needs the raw materials out of which pragmatic knowledge is made. Dr. Stiles's presentation not only arouses his interest in physiology *per se* but also leads the student to draw logical conclusions that have a bearing on his conduct and help him to form sound opinions about public health.

Physiology is based on physics and chemistry. Anatomical shapes, appearances and arrangements present no great difficulties to the student (nor do they interest him profoundly), but it is not easy for him to visualize molecules and forces and to grasp the transformation of energy by living tissue. The author is a master in explaining such intangibles relating to structure and function. He has an ingenious way of picturing concepts by the use of apt analogies. For example, why does the victim of an amputation describe minutely, pains and other feelings, which seem to come from the lost limb? The brain receiving afferent nerve impulses associated with sensory endings is like "The engineer of a steamboat (who) cannot tell whether his gong has been rung from the pilot house or some other station." Is alcohol a depressant or a stimulant? There are two ways of accounting for the increase of the speed of a train descending a grade; more power may have

been applied or the brakes may have been taken off. Alcohol takes off the cerebral brakes.

Throughout the book the author adheres closely to what is actually known. In discussing disputed subjects or unproved theories, he avoids making unequivocal statements. Excellent judgment is used in emphasizing the important and excluding the extraneous, although the appetite for more detail of certain subjects must surely be whetted.

The practical suggestions as to how the student may use his knowledge are to the point and convincing. An example is the short but excellent section on the fundamentals of sex hygiene. The style is direct, the sentences are short, the illustrations are well drawn and free from confusing detail.

H. E. KLEINSCHMIDT

**Health Horizons**—Compiled by Jean Broadhurst, Ph.D., and Marion Olive Lerrigo, Ph.D., under the direction of the Emma Dolfinger Memorial Committee. New York: Silver Burdett, 1931. 516 pp. Price, \$3.00.

*Health Horizons* is a generous grist for the mills of health education. It is a prolific source of information on an extensive variety of subjects, intimately and remotely related to the content of health education for all levels of school and university work. It is a beautiful memorial to Emma Dolfinger.

In format, type and texture this volume has an uncommon appeal. It is legible, readable and full of one-thousand-and-one things that teachers, health educators and physicians will find useful, instructive and interesting. It brings together within the covers of a single volume a vast number of essential

facts gathered from the history of science, the laboratory, the clinic and the public health field. Each paragraph is succinct, terse, and to each are attached the essential reference facts, so that where there is need, one may go back to the original contribution for a more detailed statement.

The chapter heads are appealing and provocative. There are such interesting titles as "The Use of Milk Through Sixty Centuries," "Milk and Long Life," "The Useful Soy Bean," "Plant Malnutrition," "Pulling Teeth With Ashes of Ants," "Experiments With A Willow Tree," "George Washington's Dentist," "Commerce and Epidemics."

The material is divided into 23 sections in which are included all phases of individual and community health. There is a most laudable absence of anything suggesting self diagnosis and self treatment. The book contains an intelligently selected bibliography and a detailed index.

*Health Horizons* merits unconditional endorsement. It should be in the personal library of every health counsellor and health instructor, and in every hygiene class room. IAGO GALDSTON

**Influence of Social and Economic Factors on the Health of the School Child—By Raymond Franzen. Monograph IV of the School Health Research Series of the American Child Health Association. New York. 1932. 160 pp. Price, paper \$1.00, cloth \$1.25.**

Are we spreading our school health program too thin? Should we try to reach all economic levels or should we give more attention to the less privileged in the endeavor to wipe out some of the discrepancy in health opportunity existing between the extremes of economic levels? If so, what activities are appropriate for the different groups? These are questions that run through one's mind on perusing this book.

At a time when economic conditions are subnormal, a work of this kind is particularly appropriate. Municipal economics are threatening a reduced expenditure for health activities. Where shall the paring be done? What activities shall be curtailed? Although this book does not answer these specific problems, some of its findings should be helpful in the making of administrative adjustments. It shows what is not so surprising, and yet what we are so apt to forget, namely, that as compared with the school influence, social and economic forces have a preponderant influence in determining the state of health in school children. There are measurable evidences of the beneficial effects of our school health program efforts, to be sure, but relatively they are small.

The process of untangling the social and economic influences on health in order to identify the specific end result of a specific educational or corrective program, is a very difficult and complex affair. The analytical steps portrayed in this book take account of the intricacies involved and, though unfamiliar to most of us, yet we can appreciate the reasons for this care.

Have we not been undertaking social and health studies in the past in entirely too casual a manner? In this book we begin to see a new and distinct field developing—the field of biometrics, or the application of precise quantitative measurement to human affairs. We suspect that if it is given sympathetic and kindly consideration during its early developmental stage, a powerful ally to public health effort is in the making.

A few illustrations of the detailed findings reported follow. Health knowledge of 5th and 6th grade pupils is very largely determined by intelligence. The brighter children stand higher regardless of school health training. Scores on health education tests do not reveal success in health teaching until allowance has been made for the intelligence of



the child. The children of the better-to-do families have their hearing difficulties more adequately taken care of. Visual acuity, on the other hand, is no respecter of pocketbooks. Apparently there are no economic distinctions between schools either in the occurrence of vision defects or in their correction. Teeth are better cared for in families that can afford to pay for this service. But even a stronger influence is the type of home care as represented by what may be called cultural status. In children where families show a very small degree of absorption into American life—a very small frequency of intermarriages with American born mates—there are 3 times as many first molars missing as in children where parents are of those nativity stocks which most readily intermarry with the American born.

Group differences in children in the matter of nutritional status are almost entirely accounted for by social and economic influences. School health programs show no measurable influence on nutritional status over and above these socio-economic influences.

These are some of the points brought out in this fourth Monograph. A fifth volume promised later in the year, is to be devoted to an evaluation of school health practices. HENRY F. VAUGHAN

**Man and Medicine. An Introduction to Medical Knowledge—By Dr. Henry E. Sigerist.** New York: W. W. Norton & Co., Inc., 1932. 340 pp. Price, \$4.00.

Evidently the itch for informing the public concerning medical matters, which has been so apparent in America for several years, has passed on to Europe—but what a difference there is between this book and the usual grind which is turned out by American authors! Dr. Sigerist has succeeded to the chair held for so many years by Sudhoff, the acknowledged world-dean of professors of History of Medicine.

His approach to the subject is entirely different from that of any other book with which we are acquainted, and so is his treatment: In his preface, he says, "This book is intended primarily to acquaint young people who have chosen to enter medicine with the nature of their studies and their future profession, to guide and help them through the intricacies of the material which lies before them." He is a believer in the historical method of teaching, and has selected his basic facts from history. Running through the book, there are both philosophical and religious strains, ending with a quotation from Nietzsche which might well, with the Hippocratic Oath, be required of all students for graduation.

The book begins with a foreword by Dr. William H. Welch, and we agree fully with his statement: "I know of no other work covering the same broad field . . . So simple, straightforward, and devoid of unnecessary technicalities in the manner of exposition that the interest of the general reader cannot fail to be aroused." In fact, it has not been our good fortune to meet with any other book which is so interestingly written and contains so much material of value to students of medicine, or those who are considering the study. Indeed, it would be well if the public could be induced to read this book so that the attitude and ideals of the profession of medicine might be better understood.

MAZYCK P. RAVENEL

**League of Nations Health Organization Report of the Laboratory Conference on the Serodiagnosis of Syphilis Convened at Montevideo by the Institute for the Prevention of Syphilis of Uruguay September 15-26, 1930).** Boston: World Peace Foundation, 1931. 131 pp. \$.80.

The organization of the conference corresponded in principle to those pre-

viously held in Copenhagen. Specimens collected from patients who had been carefully studied were designated by serial numbers only and given to the serologists who participated. The results obtained with eight methods which employed complement fixation and four flocculation tests were compared. The findings corresponded to those secured at the Conference held in Copenhagen in 1928. The best flocculation tests proved more satisfactory than any of the complement-fixation tests with which they were compared.

The majority of serologists taking part in the Montevideo Conference agreed that, in the hands of Kahn himself, the Kahn "standard" test, which (as was the case also at the Copenhagen Conference) proved to be absolutely specific and extremely sensitive, was the best of those demonstrated at the Conference. Müller's clotting test (modification II) and Kahn's "presumptive" test (this latter test being specially designed for the control of syphilis in course of treatment) both gave a greater number of positive reactions with syphilitic material than did the Kahn "standard" test, but also two and three nonspecific reactions respectively.

Three out of the seven modifications of the B.-W method which were compared (Sordelli, Wyler, Scaltritti-Cassiniga) gave absolutely specific results, but a smaller number of positive results with syphilitic material than did the precipitation methods mentioned above. Other modifications of the B.-W method, without giving particularly sensitive results with syphilitic material, gave from 6 to 13.9 per cent nonspecific reactions.

In view of these findings, the employment of two different diagnostic methods simultaneously was recommended.

The sensitive methods for complement-fixation used in North America were not employed at the conference. Certain of these complement-fixation tests have been shown by the coöperative studies made from 1925 to 1930 for the Committee on Standard Methods of the Laboratory Section of the American Public Health Association (*Am. J. Syph.*, 1927, 1929, and 1930) to be slightly more sensitive and no less specific in their action than the floccu-

lation tests, including those of Kahn, Müller, and Meinicke, with which they were compared. RUTH GILBERT

### Noise and Vibration Engineering—

*By Stephen E. Slocum, Ph.D. New York: Van Nostrand, 1931. 171 pp. Price, \$2.75.*

This book presents valuable quantitative data upon the sources of noise and vibration and should be of distinct value to engineers and architects confronted with problems of vibration and noise prevention.

Vibrations with frequencies less than 15 per second are felt as tremors, whereas, vibrations with frequencies between 15 and 30 per second are heard as low rumbling noises. Musical notes and ordinary noise have frequencies between 30 and 15,000 to 30,000 per second.

The prevention of vibration is a problem of structural dynamics, wherein critical speeds of structures likely to be the source of vibration are avoided, or where vibration dampers or insulators are provided to change the continuity of vibrating structures. Thus the use of sheets of cork, lead, and asbestos pads at the foot of building columns results in damping of the vibrations of foundations before they are transmitted to the main structure, or similar insulators may be placed between separate units of structures.

The book deals first with transmission of elastic ground waves, and briefly reviews geophysical investigation of underground conditions by the use of seismographs. The properties of vibration dampers and insulators are then considered. Corkboard, hair felt, rubber, asphalt, lead, asbestos, sand and gravel are considered as vibration dampers or insulators. The results of a quantitative study of these materials are presented, and the actual practice in the insulation of tall buildings against transmission vibration is reviewed, with

special reference to the Grand Central Terminal in New York and the new Pennsylvania Railroad Station in Philadelphia, Pa.

The problem of preventing vibration and noise due to street traffic is considered in a separate chapter. The importance of smooth pavement and the possibility of insulating monolithic pavement structures from buildings are emphasized. Note is also made of the very material reduction in street noise resulting from improvement in the design of vehicles, track structures, etc.

Noises and vibrations are greatly intensified in enclosed subways. Experience with this subject in New York, Boston, Philadelphia, and London is reviewed, and the conclusion is drawn that the prevention of undue noise in subways requires careful consideration of practically all details involved in construction and operation of such structures. It is possible to line subways with sound absorbing material and thereby greatly reduce noise by damping reverberations. Improvements in track structures and rolling stock also are fruitful fields of development.

The economic aspect of noise abatement is considered. Although no precise information is presented relative to damages to structures due to vibration, or relative to the economic loss resulting from the nervous strain of those exposed to noise, nevertheless, the data presented indicate the seriousness of noise in urban communities and the necessity of active steps being taken to minimize vibration and noise. In general, the varied and complex subject of the control of noise in communities is shown to justify the creation of noise abatement commissions acting under local ordinances. The book concludes with a chapter on the mathematics of vibrating structures. A 9-page bibliography is appended.

This timely book is of chief interest to architects, and mechanical and civil

engineers. The sanitary engineer and other public health worker interested in the control of the environment, however, will find much of interest in the book. The author does not attempt to give data relative to the public health importance of community noise, although the nervous strain resulting from exposure to noise is indicated by quotation from literature. One gathers the impression, however, that the problem of eliminating unnecessary noise and vibration is of vast magnitude, requiring the coöperation of everyone acting under the guidance of noise abatement commissions, rather than municipal health departments.

CHARLES R. COX

### Social Problems and Social Planning

—By Cecil Clare North, Ph.D. *New York: McGraw-Hill, 1932. 409 pp. Price, \$3.50.*

This book presents a connected sociological approach to social problems. It shows the relation of essential sociological theory to the situations out of which social problems arise and to the procedure that is involved in dealing with such problems.

Following a somewhat philosophical discussion of human needs, attitudes, values, and culture, a chapter is devoted to the question of "Making up the Social Deficit." Activities concerned with the relief of suffering are classified under 4 divisions: the care of the economically dependent; the care of the handicapped and those unable to secure medical attention for themselves; the treatment of the delinquent; the amelioration of the living and working conditions of those who are lacking in adequate social protection or social opportunities. Social case work is defined as the study of the causes for the social difficulties that a person or a family may have, and the provision of a treatment designed to remove those causes and restore the person to normal social relations.

Various references are made to the relation of public health and social work and considerable space is given to the care of the sick poor. It is stated that the healing of the bodies of the poor has been done in a much more scientific manner than has the cure of their social difficulties. On the whole, the discussion of the medical care of indigent cases is presented in fully as favorable a light as the situation throughout the country warrants. In considering the subject of population and the shaping of population policies, the discussion of arguments against birth control concludes as follows:

The most that such efforts can accomplish is to retard the dissemination of information, and prevent the practice of contraception from securing the benefits of competent medical supervision which could be more easily accomplished if legal barriers did not exist.

Chapters on Fitting Government to Changing Needs, and Goals of Social Reconstruction are among the stimulating contributions. In view of the close relationship of constructive social service and public health work, and in view of the rapidly accumulating knowledge regarding fruitful lines of endeavor in both of these fields, this volume should prove interesting and helpful to many health workers as well as to the social work group for whom it was primarily designed.

IRA V. HISCOCK

Methoden der individuellen Auslese für gewerbliche Berufe—By *Theo-hald Fürst*—in *Abderhalden Hand-buch der biologischen Arbeits-methoden*—Berlin: Urban & Schwarzenberg, 1931. Abt. IV, Teil 16, Heft 1, Lieferung 371. 288 pp. Price, 15.50 marks.

This treatise on the methods of individual selection for industrial vocations falls into the field of industrial medicine as outlined at the International Conference at Lyons, France, in 1929. As defined by the author, this medical dis-

cipline is concerned with the medical selection of the individual worker and the estimation of his performance, capacity, and competitive limitations in the labor market; with the determination and estimation of industrial hazards; the medical consideration and supervision of these hazards; the hygienic supervision and sanitation of factories and industrial processes; the statistical analysis of the biological effects of industrial life upon the workers; and the experimentation necessary for the medical understanding of the materials of industry and the mechanism of industrial hazards. This section is concerned primarily only with the methods of selecting laborers, in the light of these other aspects of industrial medicine.

Of special value are the detailed blanks used in the study of the young worker. These make use not only of formal school records, but require quite a detailed analysis of personal qualities and behavior during the years of school life. Stress is laid on the physical, physiological, mental, and emotional traits which are indicative of departures from the norm, especially at adolescence. The constitution or hereditary complex is studied with reference to the detection of diathesis or of tendencies to particular types of disease, not only in the individual, but also in his parents.

The procedures in physical measurement, in examination of glandular development, posture, muscular development, respiratory function, heart and circulation, blood, nervous system, skin, and sense organs are given in detail and the significance of the divergences are noted. The work is well illustrated and the procedures are described with full detail. They are indicative of the great advance which industrial medicine has made in Germany in recent years. The work here outlined is basic in all preventive measures for the reduction of industrial hazards, in the proper placement of the individual worker, in his

stration; then a chapter devoted to contrasting and evaluating the four demonstrations; then a chapter each on "Physicians and the Demonstrations" and "The Demonstrations and Public Opinion"; ending up with an appendix outlining the program followed and a complete bibliography dealing with them. An interesting part of the book is a foreword by Barry C. Smith, General Director of the Commonwealth Fund.

At the very beginning of his discussion, the author has started off on the right foot in his statement concerning: "The modern child health program which has *contributed* to the phenomenal reductions in infant and child mortality of the last twenty-five years" (*italics are mine*). This moderation of statement is as unusual as it is refreshing in public health literature. Even the confirmed skeptic—of whom there are too few, in public health—would not take exception to such restrained language as this: "there is evidence, then, that measurable advantage to individual mothers and children followed health department service; and that the general effect of the demonstrations was to reduce infant and child mortality in the community as a whole." Mr. Dinwiddie has wisely avoided the meticulous inaccuracy of interpreting the drop in death rate in terms of dollars and cents.

The chapter entitled "Physicians" is especially to be commended to both practising physician and public health worker. The ten statements on pages 43 and 44 offered as "reasonably fixed premises for any permanently successful community program of preventive medicine and public health" are worthy of more than casual reading. Some exception might properly be taken to certain aspects of number 9. On the other hand, items 5 and 6 set forth the plain facts when they state that practising physicians are largely unprepared to guide the public in the field of preven-

tive medicine, and the public is largely unready to demand or pay for such guidance. It is the fashion in some quarters just now to emphasize the physician's unreadiness in contrast to the supposed eagerness of the public to receive instruction in hygiene. Experienced sanitarians know that it is a case of six of one and half a dozen of the other. Very few people are as yet willing to pay for hygienic advice; they often will not bother to avail themselves of it even if offered without charge.

No one interested in child health should fail to sample this meaty little book.

MERRILL E. CHAMPION

*Methoden der Arbeitsmedizin. Klinische Untersuchungen*—By Franz Koelsch—in Abderhalden Handbuch der biologischen Arbeitsmethoden, Abt. IV, Angewandte chemische und physikalische Methoden, Teil 16, Heft 2, pp. 289–496. Berufliche Krankheits- und Sterblichkeitsstatistik. *Ibid.*, pp. 497–518. *The two in Lieferung 376.* Berlin: Urban & Schwarzenberg, 1932. Price, 12.50 marks.

This part of Professor Abderhalden's great handbook of biological methods is a part of the section devoted to industrial medicine, and Lieferung 376 contains Dr. Koelsch's papers on clinical methods and morbidity and mortality statistics. The first of these contributions deals with the instrumental equipment for investigations in occupational selection, physiological and psychological, and for the study of fatigue. This is followed by a long account of investigations on the causes of industrial diseases such as aëraemia of compressed air workers, joint necrosis of phosphorus workers, silicosis of stone workers, etc., and an interesting list of investigations in progress arising from legislation dealing with hazards in new fields in the chemical industries, and periodic exam-

inations in older and better known hazards.

The second section treats of the pathology of the organ systems, especially of the skin and nails, as affected by industrial materials, manipulative processes, temperatures, electric current, X-ray, chronic eczemas due to galvanizing, exotic woods, chemicals which may incite cancer, etc. Discussion follows of the effects of pneumatic tools on the muscular and skeletal systems; of abnormal temperatures, gases, and dusts on the lungs; of certain chemicals on the digestive and urinary systems; of organic and inorganic poisons on the

central and peripheral nervous systems; and of certain employments on the sense organs. Nearly a hundred pages are devoted to industrial poisons, and their effects on the body, especially the new hazards arising from new products of the chemical industries. A fourth section deals with communicable disease fostered by industry, such as anthrax, foot and mouth disease, and hookworm. A brief account, with illustrative tables, is given to aims, methods, and fallacies of morbidity and mortality statistics as related to industrial medicine and to occupational diseases.

CHARLES A. KOFOID

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Diphtheria Death Rates**—This annual tabulation of diphtheria mortality in our great cities reveals a continuation of the marked decline. Deaths in 1931 were only half the number reported in 1929.

ANON. *Diphtheria Mortality in Large Cities of the United States in 1931*. J. A. M. A. 98, 19:1644 (May 7), 1932.

**When to Immunize**—In children under 3 months, about one-third of all diphtheria immunizations are failures; under 9 months one-fourth failed to respond. Between 2 years and 4, 5 per cent were failures. Under 9 months of age a preliminary Schick test should be given. These conclusions are numbered among many interesting observations.

BLUM, J. *Age Factor in Active Immunization of Infants Against Diphtheria*. J. A. M. A. 98, 19:1627 (May 7), 1932.

**Prohibition and Alcoholism**—"Prohibition" has not prohibited a notable increase, since 1920, in the number of persons who misuse alcohol to such an extent that they become mentally diseased: 1920 being the dividing

line in "before and after" drinking data.

BROWN, F. W. *Alcoholic Mental Disease Before and After Prohibition*. J. Am. Stat. Assn. 27, 177A:175 (Mar.), 1932.

**The Truth About Bran**—So prolific has been the pseudoscientific propaganda about bran, and so sour the counter blasts that this effort to get down to a dispassionate study is refreshing. It seems that bran's value lies only in its fiber content, but as healthy persons need 100 mg. or more of fiber per kg. of body weight each day, bran has its place as a source of supply.

COWGILL, G. R. and ANDERSON, W. E. *Laxative Effects of Wheat Bran and "Washed Bran" in Healthy Men*. J. A. M. A. 98, 22:1867 (May 28), 1932.

**Health Administration and the Care of the Sick**—After commenting on local health services in Boston, the author raises the issue of the medical care of the sick as a function of public health administration. Some practical details involved in the problem are suggested, and though no definite solu-

tion is proposed, the picture that is raised should prove potent to provoke discussion.

DUBLIN, L. I. The Coördination of a Community's Health Services. *New Eng. J. Med.* 206, 18:938 (May 5), 1932.

**Vitamin D Values in Irradiated Foods**—Of the common foods comprising the child's dietary, concludes the author of this excellent summary, milk, both liquid and dry, has thus far proved the most successful medium for irradiation: cereals and vegetables are unimportant sources of vitamin D. This will grieve the advertisers.

KOCH, E. M. Irradiated Foods. *Pub. Health Nurs.* 24, 5:263 (May), 1932.

**Cancer Prevention Propaganda**—"The giraffe has a long oesophagus, but does not have cancer there because he uses simple food and swallows slowly. . . . The domestic cow is milked and 'stripped' every morning and evening and no one ever hears of cancer of the udder of a cow. . . ." You may write your own annotation to this.

McCULLOUGH, J. W. S. Cancer at Home and Abroad. *Canad. Pub. Health J.* 23, 5:203 (May), 1932.

**Maternal Death Statistics**—"Vital statistics as compiled by the public health authorities cannot be used as a measure of the quality of maternity care." That this conclusion is correct those who read this excellent discussion will agree and perhaps thereafter some will hesitate to rush in where statistician-angels fear to tread.

MILLER, J. R. Can Vital Statistics Be Used to Measure Quality of Maternity Care? *New Eng. J. Med.* 206, 19:999 (May 12), 1932.

**Private Practice and Preventive Medicine**—The neglect of the sick cannot continue, for opinion demands adequate care for all. For most sick persons care must be provided by society. On these postulates is based the

author's discussion of the relationship of general practice to the preventive medical program here and abroad.

NEWSHOLME, A. The Relationship of the Private Medical Practitioner to Preventive Medicine. *J. A. M. A.* 98, 20:1739 (May 14), 1932.

**Streptococcal Disease Effects and Causes**—Three characteristics of the pathogenicity of hemolytic streptococci (rash producing, pyogenic, and invasive) vary from case to case. Host defence and cite of conflict also vary. These differences account for the variety of pathological patterns of human streptococcal disease, concludes the author. That seems reasonable.

OKELL, C. C. Haemolytic Streptococci in Infective Disease. *Lancet* 222, 5667-69:762 (Apr. 9-23), 1932.

**Preschool Child Posture**—In this excellent discussion of the posture of the toddler, the futility of attempting to apply grown-up standards to this age group is wisely emphasized.

PHILLIPS, W. M. The Posture of the Preschool Child. *Pub. Health Nurs.* 24, 5:236 (May), 1932.

**Standardizing Streptococcus Antitoxins**—A practical laboratory animal method of measuring the potency of scarlet fever streptococcus toxins and antitoxins is described. The end results are superior to similar tests on human subjects. Incidentally, the differences in neutralizing value of the different products is discussed.

VELDEE, M. V. The Standardization of Scarlet Fever Streptococcus Antitoxins. *Pub. Health Rep.* 47, 19:1043 (May 6), 1932.

**Some Social Philosophy**—Food for thought for the socially minded health worker, and for those too who like this annotator would have to answer in the negative such questions as these propounded by the author: "Or did it ever occur to you to consider why there

## NEWS FROM THE FIELD

### STATE CHARITIES AID SIXTY YEARS OLD

THE State Charities Aid Association of New York celebrated its 60th birthday on May 11, 1932. The original purposes for which the Association was founded in 1872 still hold: To promote an active interest in public charitable institutions in the State of New York, in order to improve the condition of their inmates, and to make more efficient the public relief system in the light of "the most enlightened views of Christianity, Science and Philanthropy."

### LOS ANGELES PUBLIC HEALTH EXHIBIT

THE first display of equipment, materials, methods and services for the furtherance of public health ever to be held on the Pacific Coast has been announced. This will be the Los Angeles County Public Health Exposition, to be conducted under the sponsorship of the Los Angeles County Tuberculosis and Health Association, and will be held from August 12 to 18, in the permanent buildings of the International Industrial Expositions, Limited.

### NEW YORK STATE SEWAGE WORKS MEETING

THE New York State Sewage Works Association held its Spring Meeting at Buffalo, N. Y., June 10 and 11. Important papers were presented by Clyde Potts, Harold J. Huber, Edmund B. Besselièvre, A. F. Dappert, C. C. Agar, Earle B. Phelps, K. A. Keirn, and others.

### GILMORE MEMORIAL FOUNDATION

TO perpetuate the memory of Eugene S. Gilmore, for 25 years Superin-

tendent of the Wesley Memorial Hospital, Chicago, the Eugene S. Gilmore Memorial Foundation has been created by his friends and associates. The Foundation will create a Fund, the income of which will be used in establishing scholarships for the graduates of Wesley Memorial Hospital School of Nursing.

### COURSES ON CHILD HYGIENE IN ITALY

THE National Children's Bureau of Italy has just issued a circular to its provincial branches ordering the establishment of popular courses on maternal and infant hygiene for girls between 16 and 18 years. The courses are to consist of practical and theoretical work and are to be given preferably in infant welfare institutions, for instance, day nurseries. The girls attending such courses will not be entitled to diplomas because these are issued only to graduates of special courses for the training of persons intending to take up maternal and infant welfare work as a profession.—*Maternità ed Infanzia*, Rome, Jan., 1932.

### MEDICAL COLLEGE OF VIRGINIA

THE Carnegie Corporation of New York has made an appropriation of \$10,000 toward the maintenance of the library of the Medical College of Virginia, which will be housed in a new building this summer. Adjoining the new library of the college, the Richmond Academy of Medicine has built its home and library, which will contain the famous Joseph L. Miller collection of rare first editions, engravings, silhouettes, medical curios, etc.



## FLORIDA PUBLIC HEALTH ASSOCIATION

THE Florida Public Health Association has become a member of the American Public Health Association, and is therefore now included among the Affiliated Societies with a representative in the Governing Council of the Association—this representative to be announced later.

The present officers of the Florida Public Health Association are as follows: President, Horatio Newton Parker; First Vice-President, Inez M. Nelson, R.N.; Second Vice-President, Rothwell Lefholz, M.D.; Secretary, Stewart G. Thompson, D.P.H.; and Treasurer, Stewart G. Thompson, D.P.H.

## GORGAS ESSAY CONTEST

HARRIET JONES, a high school junior in St. Agnes School, Albany, N. Y., was awarded the Henry L. Doherty Prize of \$500 for the winning essay on mosquitoes in the Fourth Annual Gorgas Memorial Essay Contest.

President Hoover, as Honorary President of the Institute, presented the award at the White House on June 9.

The subject of this year's contest was "Mosquitoes, Their Danger as a Menace to Health, and the Importance of Their Control." High school juniors and seniors from every state and the District of Columbia participated, and 15,000 manuscripts were submitted.

## MEDAL FOR DR. THEOBALD SMITH

THE Council of the Royal Society of Tropical Medicine and Hygiene of Great Britain, at its annual meeting, June 16, awarded the Manson Medal to Dr. Theobald Smith, of Princeton, N. J., director emeritus of the Department of Animal Pathology, Rockefeller Institute for Medical Research, New York, and formerly professor of comparative pathology, Harvard University.

## MEMORIAL TO C. HAMPSON JONES

A COMMITTEE has been formed to arrange for a memorial to Dr. C. Hampson Jones, Charter Fellow of the A.P.H.A., who died April 11, for many years Health Commissioner of Baltimore, with Dr. Huntington Williams, Director of Health, as chairman. The memorial will take the form of an oil portrait of Dr. Jones, to be placed in the Health Department offices.

## PERSONALS

SIR HENRY WELLCOME, LL.D., F.S.A., founder of The Wellcome Research Institution, has been elected Honorary Fellow of the Royal College of Surgeons of England. Sir Henry Wellcome is of American birth, and is well known for his world-wide scientific work and extensive pioneer researches in connection with tropical diseases, including the founding of The Wellcome Tropical Research Laboratories at Khartoum on the Upper Nile Regions of the Sudan, Africa. He is also a director of the Gorgas Memorial Institute, Washington, D. C., with its Tropical Research Laboratories at Panama.

DENNETT L. RICHARDSON, M.D., member A.P.H.A., formerly Superintendent and Resident Physician of the Providence City Hospital, now known as the Charles V. Chapin Hospital, was appointed Superintendent of Health of Providence, to fill Dr. Chapin's place.

MATHILDE S. KUHLMAN, R.N., Director of the Division of Public Health Nursing of the New York State Department of Health, died suddenly on May 30. Miss Kuhlman was a former president of the State Organization for Public Health Nursing, Fellow of the A.P.H.A., member of the American Nursing Association, National League of Nursing Education, and the Albany City Club.

## CONFERENCES

July 21-29, 100th Anniversary Meeting, British Medical Association, London.

July 25-30, Regional Conference of the World Federation of Education Associations, Honolulu, Hawaii.

August 12-18, Los Angeles County Public Health Exposition, Los Angeles, Calif.

September 6-9, International Union Against Tuberculosis, The Hague.

September 12-19, American Hospital Association, Detroit, Mich.

October 3-7, Twenty-first Annual Safety Congress and Exposition, Washington, D. C.

October 24-27, 61st Annual Meeting, American Public Health Association, Washington, D. C.

November 14-18, Tenth Annual Short School, Texas Public Health Association, Dallas, Tex.

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## IN JUNE

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*Among the outstanding articles  
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**Cleansing of Communities**

MORRIS M. COHN, M.Sc.

**The Nurse in Industry**

W. W. BAUER, M.D.

*Director, Bureau of Health & Public Instruction,  
American Medical Association*

**Science of Life**

(With Special Emphasis on Maternity)

PARLANE KINLOCH, M.D., D.P.H.

*Chief Medical Officer, Department of Health,  
Scotland*

**A Study of the Convalescent  
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JANET P. JOHL, A.B.

**Health and Sanitation in the  
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# American Journal of Public Health and THE NATION'S HEALTH

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## Some Epidemiological Aspects of Psittacosis\*

H. E. HASSELTINE, M.D., F.A.P.H.A.

*Senior Surgeon, U. S. Public Health Service, Washington, D. C.*

IN the winter of 1929-1930, the appearance of psittacosis in the United States and in various parts of the world drew the attention of health authorities to this disease. Until that outbreak it was considered as a disease of birds of the parrot family that occasionally affected man and was supposedly caused by the *B. psittacosis* of Nocard, a member of the *Salmonella* group, practically identical with *S. aertrycke*.

With the recognition of a disease of human beings apparently due to association or contact with birds of the parrot family, many public health laboratories began work upon the affected birds to throw light upon the diagnosis of the condition. Many workers failed to cultivate *B. psittacosis* from any of the sick, or dead birds, while a few succeeded, obtaining it from a small proportion of the birds examined. However, it did not take long to ascertain that the infection was communicable from birds to laboratory workers.

At the National Institute of Health (then the Hygienic Laboratory) two persons assigned to the work on the disease became ill within a short time, one resulting fatally. A third worker who carried on the investigation for approximately 1 month escaped the infection. However, 9 other persons who had no direct connection with the work on psittacosis but whose duties required them to work in the same building developed the disease. At about the same time 2 workers in the Baltimore City Laboratory developed the disease, and 1 of these, Dr. William Royal Stokes, director of the laboratory, died.

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\* Read at the Third Annual Meeting of the Western Branch American Public Health Association, at Denver, Colo., June 10, 1932.

Other cases occurred in the New York State Laboratory at Albany and in the New York City Laboratory.

Investigations carried out in Europe by Bedson, Western and Simpson, and in the United States by Krumweide, McGrath and Oldenbusch, and by Armstrong, McCoy and Branham, showed the disease was due to a filtrable virus. Krumweide, McGrath and Oldenbusch found that it could be transmitted to white mice. Studies of the pathology of the disease in birds by Levinthal in Germany, Lillie in the United States, and Coles in England showed lesions differing in some respects from those found in other conditions, particularly in that certain cells contained rickettsia-like bodies to which Lillie gave the name *Rickettsia psittaci*. Whether these bodies have a causal relationship to the disease, or appear as a result of the infection is not yet determined.

After the development of cases in their laboratory workers, the New York City Department of Health turned over its birds and experimental animals to the Rockefeller Institute of Medical Research, where investigations were continued under strict precautions to avoid laboratory infection; yet later on, 1 case developed in this laboratory. Continuing the work begun by Krumweide and his associates, Rivers and Berry were able to establish the infection in white mice, and later on in other laboratory animals. It was found that in mice the disease was far less dangerous for laboratory workers than when birds were used as experimental animals, and, therefore, cases of laboratory infection have been few since that fact became known. These workers also showed that if the virus is introduced into the nose or trachea of monkeys, the animals contract the disease and show pulmonary lesions resembling pneumonia. If the virus is injected intracerebrally the pulmonary lesions are not found though the animal develops a meningo-encephalitis. This finding suggests that most of the cases of psittacosis receive their infection through the respiratory tract. Armstrong reports that in the 1929-1930 outbreak there were 169 cases with 33 deaths in the United States. This outbreak was attributed to the importation of infected parrots, though occasionally human cases were found to be associated with parrakeets or canary birds.

Early in 1931, 5 cases with 2 deaths occurred in New York City that were traced to "love birds," a term that is frequently applied to parrakeets. These birds had been brought into the United States from Havana.

In October, 1931, another group of 3 cases, with 1 death, occurred in New York City. These cases were traced to shell parrakeets that

were obtained from San Francisco. Subsequently it was ascertained that at least a part of this shipment had been imported from the Orient. The diagnosis was established by laboratory tests upon mice.

Early in December, 1931, the California State Department of Public Health learned that 3 of 4 persons who had spent one day (November 27) at a certain home in Grass Valley, Calif., had been taken sick at approximately the same time. The fourth person sickened about a week later; all 4 died. Upon investigation it was found that a pair of shell parrakeets had recently been introduced into the household, the birds having been obtained from an itinerant vendor. One of the birds died a few days after it was acquired. The other bird, although apparently healthy, was subjected to laboratory examination and the presence of the virus of psittacosis was proved. Later similar findings were obtained from autopsy material from one of the human cases.

Subsequent investigations showed that itinerant bird vendors had visited various parts of the state and that in many families that had bought birds there had occurred peculiar cases of disease, some of which resulted fatally. One of these bird vendors had obtained at least a part of his parrakeets from the San Francisco dealers who had shipped the birds to New York City in September that resulted in the 3 cases of psittacosis in New York in October and November, mentioned above. It, therefore, seemed likely that most of the cases traced to birds sold by this vendor could be attributed to imported birds. However another California patient obtained parrakeets from another vendor whose source of supply was California bred birds. Further inquiry revealed a parrakeet breeding industry in California that is of considerable magnitude. Subsequent investigations have furnished ample evidence that some of these breeding establishments harbor birds that carry the virus of psittacosis. These investigations have also shown that many birds may act as apparently healthy carriers of the infection. The extent of the infection in these aviaries is not fully determined, but all indications suggest that it is sufficiently extensive to constitute a most perplexing problem.

From what has been related above, it seems apparent that we have in the United States a disease of birds that is highly communicable to man. The specific cause is a filtrable virus; the chief contributing cause is contact with infected birds or human cases of the disease, or their environment, either as a result of occupation, family association, or casual circumstances.

Since Armstrong collected data on the cases of the 1929-1930 outbreak, I have obtained information on 12 cases occurring in New

York and 43 cases occurring on the Pacific Coast, which is recorded here. Of the 43 cases occurring in California, laboratory examination of the suspected birds was made in 24 cases, of which 20 showed positive results, 1 negative, and 3 were incomplete at the time of compiling these figures.

#### INFORMATION COLLECTED ON 55 CASES

*Sex*—Of the 55 cases, 18 (32.73 per cent) were males, 37 (67.27 per cent) females. It is believed that the greater frequency in females is due to the fact that women spend a greater portion of their time in the home, usually care for the birds, and frequently handle them and teach them certain tricks, such as taking food from the mouth of the mistress, which result in closer contact with the birds. It is of interest to note that Barros reports an outbreak in Argentina where the birds were attended largely by men and cases of psittacosis were far more prevalent in males. We have no reason to believe that sex *per se* has any influence on the incidence of the disease in human beings.

*Age*—Armstrong found cases in all age groups, though more frequent in those between 20 and 70 years of age. The ages of the 55 cases under discussion are given in Table I.

TABLE I

Age Group	No. of Cases		No. of Deaths	
	Male	Female	Male	Female
10-19	0	1	0	0
20-29	1	1	0	0
30-39	3	7	2	0
40-49	9	13	2	0
50-59	1	10	1	5
60-69	3	3	2	1
70-79	1	2	0	0
	18	37	7	6

Armstrong calls attention to the fact that in his group of 167 cases there were no deaths below the age of 30, while approximately 24 per cent of those above 30 proved fatal.

*Occupation*—Any occupation that brings the individual into contact with birds of the parrot family may be considered as a contributing cause. The occupation that heads the list is that of housewife, and the explanation of this is given under the consideration of the sex distribution of cases. Three of the women in the group of 55 cases herein reported probably contracted the disease as a result of nursing human cases. One man worked in a pet shop that had infected birds. Fourteen were owners of parakeet breeding establishments. Eight of these aviaries showed positive results on examination of their birds; 1 gave negative results; and in 5 the laboratory tests were not made or had not been completed at the time of compilation of this report. Two cases, man and wife, owned an aviary of canaries which showed the infection present in 2 of 11 birds examined. One patient was a customs inspector whose duties required him to examine shipments of birds at their port of entry; another was a health official assigned to duty inspecting aviaries; another was a butler in a house

that harbored parrots; and another was a laboratory worker who obtained supposedly normal parrakeets for experimental use in studying a disease of parrot-like birds, other than psittacosis. His sputum, when inoculated into mice, showed that his illness was psittacosis and not the disease he was investigating.

*Seasonal prevalence*—The colder months of the year have thus far furnished the greater number of cases. Possibly the exceptionally cold winter in California has had a part in precipitating the outbreak of 1931-1932.

*Contact infection*—Although instances of the transmission of the infection from one human being to another are relatively few, the reporting of such cases has been sufficiently frequent to prove that the disease may be contracted in this manner. In a few instances all contact with birds of the parrot family has been excluded. Sturdee and Scott describe a case in a physician who attended a case of psittacosis. The patient went to the physician's office for consultation and did not see the physician again until 1 week later when the doctor was called to the patient's home to attend him. The bird that presumably infected the primary case had died 2 or 3 days before the physician made his first visit to the patient's home. Twenty-four days after the date of this first visit the physician became ill from psittacosis. Also a sister of the primary case came to nurse her brother, arriving at the home after the death of the parrot. Within 2 weeks she also became sick with psittacosis.

Armstrong reports 2 cases where persons nursing fatal cases of psittacosis contracted the disease, and in both instances the history of contact with birds of the parrot family was lacking.

One of the cases occurring in the California group was undoubtedly contracted while nursing a relative who died of the disease. The primary case, one of the group of 4 cases that brought the existence of psittacosis to the attention of the State Department of Public Health, received her infection at Grass Valley, Calif., on November 27, 1931. She was taken sick on December 6, 1931, after she had returned to her home, about 150 miles from the place she received the infection. When she became sick she summoned a niece to attend her in the capacity of a nurse. She nursed the patient from December 7 to December 12, on which date the patient was removed to a hospital where death occurred on December 18. On December 16 the niece was taken sick with symptoms of psittacosis. She recovered after an illness of about 3 weeks. In this instance the secondary case had not been within 150 miles of the birds that infected the primary case, and no history of contact with birds at any other place could be obtained.

Two other California cases are cited as illustrative of another group that is probably due to human transmission, though remote contact with birds cannot be absolutely excluded. Both were nurses who attended 2 cases of psittacosis in a family. The primary cases, man and wife, were taken sick on February 3 and February 5, respectively, and the man died on February 25. One nurse was taken sick on March 3, the other on March 10. This couple had about 25 parrakeets in a cage in their backyard. The nurses stated that they had never been near the cage nor in contact with the birds, though a blanket that was used to cover the cage had been thrown over a line in the yard and they had walked past this blanket.

An interesting addition to our knowledge of the disease was obtained from this group of birds. Three of the 25 birds became sick and died. Laboratory examination proved them to have had psittacosis. The remaining 22 birds, apparently well, were then sacrificed and each subjected to laboratory examination:

13 of the 22 were found to harbor the virus of psittacosis. In 3 other California cases possibility of infection from a human case was found though the secondary cases also gave a history of contact with infected birds.

While on the subject of transmission from man to man, it is desired to call attention to the fact that many of the instances where secondary cases have been found, the primary case has resulted fatally. Whether this means that the virus is more potent or that it is more effectively disseminated by the primary case, or that some unknown factor may have an influence, cannot be stated at this time. We do know that most of the cases develop a peculiar pneumonic lesion. While cough and expectoration are not prominent symptoms in the average case that ends in recovery, it frequently happens that in the late stages of a fatal case repeated efforts are made to clear the air passages of a thick tenacious sputum by coughing. This would greatly increase the possibility of dissemination of the disease by the droplet method.

#### CONTROL MEASURES

Psittacosis is a disease that affects man largely as a result of human fondness of pets. Rabies also qualifies in this class. In theory, both are easy to control, but our difficulties in controlling rabies warn us that psittacosis will also be a difficult problem. Fortunately, the psittacotic bird is not aggressive as is frequently the case with rabid animals.

The essence of the prevention of psittacosis lies in avoiding contact with birds of the parrot family. Thus far I have yet to find any argument that proves parrots or similar birds are a *necessity*. Neither have I found any one who can show that they fulfil any economic function. The parrot industry is founded upon the natural love of pets by human beings. To do away with pets it is necessary to change human nature.

Control measures therefore must be relied upon, and these divide themselves into two sub-heads, (1) restrictive measures, (2) educational measures.

Restrictive measures may be further subdivided into those applicable to importation of birds, and those applicable to domestic bred birds. Parrots and the larger birds of the parrot family do not breed in captivity to an extent that will make domestic raising of such birds profitable. On the other hand, parrakeets and love birds will breed readily in captivity in the United States, and a rapidly growing industry in breeding these birds has become established in Southern California.

The following measures are applicable to imported birds:

1. *Embargo*: This aims to exclude all birds specified in the embargo order. During the outbreak of psittacosis in 1929-1930 an embargo on parrots was made effective January 24, 1930. The



embargo did not apply to other birds of the parrot family as the outbreak of 1929-1930 seemed to be almost wholly due to infected parrots.

2. *Quarantine*: On October 21, 1930, this embargo requirement was modified so that parrots might be admitted if shipped under prescribed conditions and detained at the quarantine station at the port of arrival for 15 days, provided none of the birds showed signs of illness during the detention period. Other members of the parrot family were not subject to detention. This provision has been in effect for more than 18 months, and human cases of psittacosis tracing to parrots have been few, if any. On the other hand, numerous cases have been traced to other imported birds of the parrot family, and in February, 1932, the detention period was extended to cover all birds of the parrot family.

At about this time it was found that psittacosis was present in domestic parrakeet aviaries, so it has been difficult to say what has been the effect of this detention of imported birds since that time. Recent findings that apparently healthy birds may be carriers of the virus lessen the value of quarantine detention as a control measure.

3. *Import duty*: The customs duty on imported birds has been low. While an absolute embargo may work a hardship upon some scientific organizations that desire to import birds, as well as upon individuals desirous of having birds at any price, a high duty on psittacine birds would allow importation in such instances yet largely restrict commercial traffic in such birds.

Several control measures are applicable to birds bred in the United States and to establishments handling imported birds after arrival.

1. Every person or firm engaged in the breeding, buying, selling or exchanging of birds of the parrot family should be registered in the office of the proper health authorities.

2. Every person or firm engaged in any of these activities should be required to keep records whereby the tracing of infection may be facilitated. Such records should also include information as to cases of illness and death among birds in the establishment. Such records are always to be available to the health authorities.

3. The sanitation of aviaries and pet shops may be left to judgment of the local authorities, due attention being given to housing conditions for birds, particularly overcrowding, cleanliness and proper maintenance of the plant. The same conditions should be considered for shipments of birds while in transit.

4. Isolation of sick birds should be required and, if possible, laboratory examination of birds dying from disease, for evidence of psittacosis should be made.

5. If necessary absolute quarantine of an establishment may be invoked.

On a recent visit to California I visited several parrakeet breeding aviaries and learned that in nearly every brood of young parrakeets there are a varying number of "crawlers." A "crawler" is a young parrakeet that is too weak to fly when the bird leaves the nest. Such birds drop to the bottom of the cage and crawl about the floor for a time. Many of them die, but some gain sufficient strength to enable them to fly.

I also learned that such birds are often bought by bird vendors, particularly itinerant peddlers, at a very low price and notwithstanding the loss of a considerable number by death; the survivors are sold at a sufficient advance to make the transaction profitable.

In view of the prominent part played by parrakeets sold by peddlers in the California outbreak, and the frequent history of sickness and death of the birds acquired shortly after purchase, it occurred to me that possibly these weak birds or "crawlers" may actually be cases of psittacosis in birds. It is well known that the greatest mortality in aviaries is in the young birds, suggesting that possibly the older birds have had the disease and recovered. If such is the case, an effective control method might be found in requiring birds to be held until they have reached a certain age before they are disposed of by the breeders.

#### EDUCATIONAL MEASURES

These consist of the dissemination of information concerning psittacosis and how to avoid it. Emphasis should be laid upon the fact that if contact with birds of the parrot family be avoided, the danger of contracting the disease is greatly reduced. Those persons who will not avoid all contact with psittacine birds should be warned (1) of the dangers of psittacosis; (2) that it is more likely to appear in cold weather when the birds are kept within the home and in closer contact with human beings; (3) that recently acquired or young birds are more dangerous than birds that have been in the family for some time, *provided such birds have not been in contact with infected birds* (some of the cases of psittacosis discussed in this paper were contracted from birds that had been in the family for years, but had been taken to an infected bird shop for treatment or for boarding during the absence of the owner); (4) that the practice of feeding birds from the mouth, "kissing," etc., is extremely dangerous if the bird harbors the virus of psittacosis; (5) that any sickness in birds should be regarded as suspicious; (6) that cages should be kept clean, cleaning

being preferably done out of doors in the sunlight after the cage has been moistened to prevent the dissemination of dust.

Should a case of psittacosis occur in a member of the household it should be isolated and ordinary bedside prevention measures applicable to other infectious diseases should be practised, particularly the disinfection of sputum, the use of gauze in place of handkerchiefs, the gauze being burned after it has been used.

It is believed that the educational measures should be stressed since the American public knows little, if anything, concerning this dangerous and relatively highly contagious infection.

#### ACKNOWLEDGMENTS

Grateful acknowledgment of indebtedness to each of the following groups is hereby made, for information and data furnished: California State Department of Public Health; City Health Departments of San Francisco, Los Angeles and New York City; the local health officers of places where cases of psittacosis have occurred; the attending physicians of such cases; Dr. Karl F. Meyer and his staff of the George Williams Hooper Foundation, San Francisco, and Drs. T. M. Rivers and G. P. Berry of the Rockefeller Institute for Medical Research, New York, for information on laboratory results.

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## Poliomyelitis in San Francisco

IN 1930, the California district experienced its most extensive outbreak of poliomyelitis. Beginning in June, 1930, the epidemic continued through the following March. There were reported 245 local and 50 non-local cases, and 32 deaths. Although no part of the city was free from the disease, it was found that the prevalence was directly proportional to the density of population. Males were affected more frequently than females and 75 per cent of the males were hospitalized.—J. C. Geiger and J. P. Gray, Statistical Study of Poliomyelitis in San Francisco in 1930, *J. Prev. Med.*, 6:145 (May), 1932.

# Contributions of the Western Branch to Public Health\*

KENDALL EMERSON, M.D.

*Acting Executive Secretary, American Public Health Association,  
New York, N. Y.*

THE success or failure of any government in the last analysis must be measured by the well-being of its citizens." The triteness of these words in a recent communication of Governor Roosevelt does not detract from their importance. It is a sentiment that cannot be too often repeated. It is well, therefore, to inquire in whose hands rests the responsibility for the well-being of the citizens of a community.

The obvious answer is that the responsibility rests in the hands of government. But government is an abstraction. It is not an automatic machine which once wound up will run indefinitely on its own momentum. It may be compared rather to an electric current which derives its power from an informed voting constituency and transmits it through elected administrative officers. To this definition should be added the comment that it is human and therefore fallible. Our Constitution states that the objective of government is to secure to the governed enjoyment of life, liberty and the pursuit of happiness. With all three of these objectives public health is inextricably linked. No other single function of government touches so universally every phase of man's existence.

It is this fact which has turned the minds of an increasing number of leaders in medicine into public health channels during the past 50 years. So far-flung a responsibility must be left in no detail to chance. Health administration is no longer a job; it is a vocation. He who is called must dedicate himself to the task with humility, fortitude and self-denial. On his honorable discharge of the duties which his profession imposes depends in very truth the inalienable right of his fellow citizens to life, liberty, and the pursuit of happiness.

The vision of certain early pioneers more than 60 years ago recognized the future magnitude of this responsibility, caused them

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to see the need of adequate professional organization, and led them to the establishment of the American Public Health Association. The career of our Association has not been unfraught with difficulties. So rapidly growing a profession must of necessity be recruited at first from the material at hand, devoted enough, without doubt, but untrained—men and women of the pioneering type who are rather notoriously restless under the restriction which organization implies. In this, the experience of public health is in no wise unique, for every institution in the too rapidly growing fabric of our social development has suffered in kind from the emotional imbalance of adolescence. But through shadow and sunshine the A.P.H.A. has plodded sturdily along justifying in fair weather and in foul the need for its existence, its power for good in promoting the well-being of the people.

The controversial element in human nature is at once its strength and its weakness. Especially do Americans love debate. Vocal minorities are one of our most cherished institutions. The Irishman expressed this well when he said, "Far be it from me to spoil a good fight by rayfusin' to participate." It is somewhat striking as one reviews the history of the A.P.H.A. to note the prevalence of a certain centrifugal tendency. The psychologists call it the schizoid temperament. At the same time they point out that it is not necessarily a characteristic of what we call strength of character, but may rather indicate a certain belligerency and egocentricism, by no means indicative of true greatness. Because of the broad interests covered by our Association and the devotion of its various members to the fields of their special culture, it is in no wise strange that rifts should have occurred. It would have been unhealthy had this not been the case. That we should pass through such periods was inevitable. But it is my firm belief that the day for rugged individualism in public health is over as it is in business and in international relations. We can never possibly all agree, since no one of us is ever wholly right, but we can go far along the road if we will each recognize the limitations imposed by the fact that he is human.

When the Western Branch of the A.P.H.A. was projected, I am informed, there was some hesitancy on the part of the Association in approving the suggestion. This was perhaps based on a natural caution derived from past experience. Almost the first, and one of the pleasantest duties that devolved upon me when I had the honor to assume the acting-secretaryship of the Association was a visit last year to the June meeting of the Western Branch in Seattle. I went as a novice, and as a stranger to much of the historical setting of the national and branch organizations. With no preconceptions, there-

fore, I could fling myself freely into enjoyment of the occasion, and it is a delight to have this opportunity to express the admiration for the Western Branch which that meeting aroused. Never have I attended a meeting where the spirit of coöperation, sincerity and good fellowship more completely prevailed. Nor have I often been at meetings where the papers were so uniformly good, the audience so alert, and the discussion so inspiring. I recall expressing some such feelings at a brief luncheon talk and stressing the fact that, while I hoped the East could still make some contributions of value to the West, I was never so convinced that the East could not possibly do without the priceless contributions to public health work which it lay in the power of the West to make.

We live in a big country and while we may perhaps love it all, yet in the words of Kipling:

God gives all earth all men to love  
Yet since our hearts are small  
Ordains to each one place shall be  
Beloved over all.

We will and should love our own home best, but in its extreme form that virtue becomes a vice as is so well demonstrated in the parochially minded members of our Congress who permit their sectionalism to inhibit the essential functions of our government. Our situation is happier since we are dealing not with a regional but a universal problem. The health of your country can be assured not alone as you do your work well but as the man next door does his equally well. And this principle has nation-wide application. If health were a different thing in California from what it is in Maine, if methods of maintaining the welfare of the people in one region differed radically from those of another portion of our country, we might look with apprehension at the possibilities implied in the development of sectional branches. With common objectives and working on common principles, organization depends on administrative expediency. Strong branches demand strong roots. The national Association will be as strong as the sum of its parts, and the more democratic its organization, the more effective will be its influence.

Now let us examine in brief detail what the Western Branch has done in the 3 years of its glorious existence. Consider first some of the practical results achieved. It has perfected an organization with regularly elected officers, a constitution and by-laws. It provides for an annual meeting where the business of the organization is transacted and scientific papers are presented, while at the same time opportunity is afforded for that most valuable service which a meet-

ing can render, the personal contact and social conference between men of similar interests but so scattered as to render frequent visits impossible.

Membership in the Western Branch includes workers in the 11 western states, Alaska, Hawaii, the Philippines, and British Columbia. These regions possess certain peculiar health problems incident to their vast and often thinly populated extent, their enormous mining and agricultural interests, and their considerable seasonal migrations due to industrial conditions within their boundaries. The West is a territory where travel abounds and visitors from all parts of the world bring with them the special problems of a roving populace. Racial admixtures on a considerable scale prevail in many parts and the adequate care of Orientals, Indians, and Mexicans furnishes constant food for discussion and conference. The opportunity afforded by a closely knit organization for the consideration of such mutual problems is self-evident.

Through the foresight and good judgment of its officers, the Western Branch has established a public health department in the *Western Hospital Review*, a widely read monthly magazine. In this department are published papers selected from those presented at the Annual Meeting of the Branch. The JOURNAL editors have called my attention to the fact that too few articles appear in that publication over the signatures of our western members. While it is fitting that papers dealing with matters of local concern appear in the *Western Hospital Review*, it is equally true that much which emanates from that part of the country has nation-wide interest. So far as is humanly possible in the limitations of the JOURNAL's pages, special articles from the West will always be heartily welcomed and gladly published.

From the start the very efficient Secretary of the Branch introduced a *Western News Letter*, issued monthly by the New York Office, which contains important news items from all parts of the country, but serves the nearer needs of the Western Branch in particular as its official organ. It is read with deep interest by Fellows and members of the Association over widely scattered areas. Lately the A.P.H.A. has adopted the idea for its own use, and two numbers of the Association's news letter have already been issued. In case the Western Branch feels this to be an infringement we will gladly change the form and name, but the idea seemed so good to us that we adopted it *in toto* for occasional national use.

There has been a notable growth in membership for the American Public Health Association as a direct result of the interest aroused in

the western states through the active work of the Branch. This is still evident and, although hard times of necessity slow up the growth temporarily, new members from the West continue with gratifying regularity to send in their applications. The Association leans heavily upon its membership for support and every present member can render inestimable service by stimulating all health workers with whom he comes in contact to join the society both for its larger support and for the unquestioned benefits which membership assures.

I have not exhausted the list of practical benefits accruing from the establishment of the Western Branch, nor have I attempted to forecast its possibilities for the future. These stretch out along a glowing pathway, but I must conclude this discussion after referring to another, less tangible, benefit which the organizers of the movement had in mind and in which their hopes have been abundantly fulfilled.

Last year just before his untimely and greatly lamented death, I had the privilege of talking with Dr. Hassler of San Francisco, who may be called the father of the Western Branch. He described to me the ambition for the more rapid development of public health in his part of the country which had led him to promote and launch the enterprise. He spoke at the same time, and with feeling, of his loyalty to the parent Association. But he referred to the vastness of the country, the limitations of time and money which make it so difficult for a health worker to travel, the need for injecting *esprit* and hope into the mind and heart of the isolated worker whose struggles and successes appeared to bring so little sympathy and reward. It was the man of vision who spoke, a bit bowed down by the titanic task which the public health officer must face, but at the same time buoyed up by the bright picture in human welfare which could be painted when once public health was organized on a genuinely efficient basis. It was this ideal which infused his whole life's work and which was reflected in no small measure in his effort to bring greater solidarity into the public health field by supplying a ready means of closer contact between the workers. This ideal is one to which we may all subscribe and for which we should all fight without capitulation. Mourned and missed by all his colleagues, he was called away while the fruition of his dream was still in the bud. I suggest that we who remain cannot do better than to press on in his footsteps till this organization for the good of the health worker, but far more for the good of the citizens of these several states, shall have achieved the great future toward which his steadfast eyes were turned.



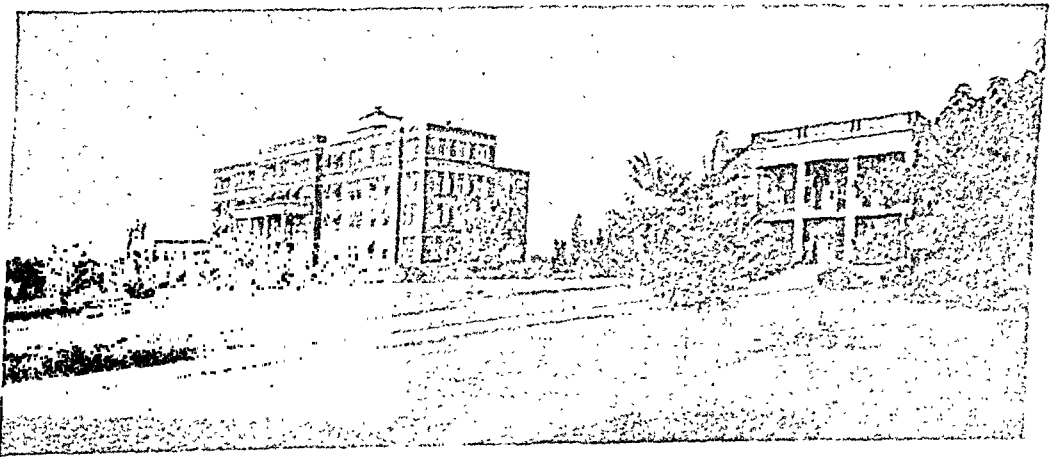
# A County Hospital Health Center

MICHAEL M. DAVIS, PH.D., F.A.P.H.A., AND MARY ROSS  
*Julius Rosenwald Fund, Chicago, Ill.*

THE fundamental job of modern medicine is to keep the patient from getting sick at all; the second, failing prevention, to find him while he still is well enough to be up and about and treat him in home, office, or clinic, to forestall serious illness, if possible. And when both these hurdles have been lacking or have proved ineffectual, there must be the hospital, where both doctor and patient will find all the resources that medical science provides for care and cure.

The Spartanburg General Hospital in Spartanburg, S. C., is unusual, possibly unique, in bringing together under one direction all three of these aims. The hospital itself is a county institution, maintained by public appropriation, private contributions and patients' payments. Its group of buildings consists of the General Hospital with 130 beds for white patients; the Negro Hospital with 50; a building housing out-patient and social service departments, and an isolation unit of 12 beds; nurses' home, laboratory and other service units. Two miles away, the tuberculosis department has beds for 46 white and 20 negro adults, and 30 children.

The unusual quality of the Spartanburg Hospital, however, does not lie in its attractive and adequate plant but in the network of



*The Spartanburg General Hospital, Spartanburg, S. C.  
At the right is the Nurses' Home, at the extreme left the Outpatient Building, which  
houses also the social service department, county health department  
headquarters, and an isolation unit*

service which has spread out from the institution as a center to meet the medical and social needs of the county. Its superintendent, Dr. J. Moss Beeler, is also the director of the county health department, which has its headquarters in the hospital out-patient building. The medical director of the hospital's tuberculosis department, Dr. J. Fabian Busch, serves also as assistant county health director. Laboratory, X-ray, and social services are used alike for in-patients in the three hospital units, for out-patients in the hospital clinics, and the county health department, with its nurses, nutrition workers, itinerant clinics, health centers, and the like. A central record system makes it possible to see at a glance what contacts a patient has had with any branch of the organization. Except in emergencies, free and part-pay patients are admitted to the hospital through social service in the out-patient department. Hospital patients from the county districts are referred on discharge to the county nurses for follow-up.

Through the clinics and nursing supervision in the county, many patients can be saved the necessity of a stay in the hospital; through supervision after hospital care, many can be helped to guard against relapse. Meantime in hospital, clinics, schools, churches, and other community centers, the educational services of the health department are working to prevent the need for care, notably in pellagra and tuberculosis.

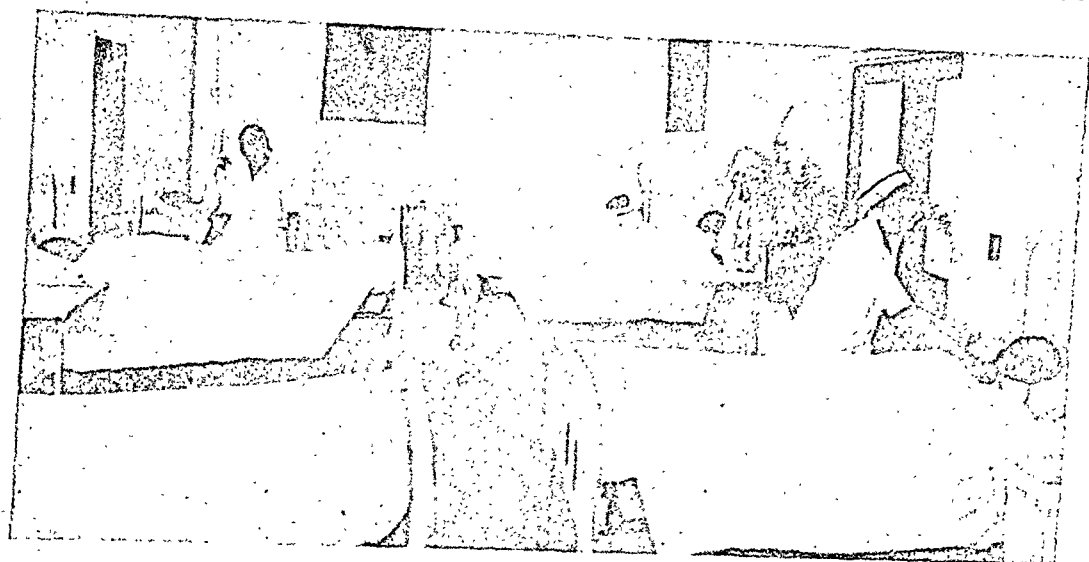
In the words of Dr. Beeler:

Our objective is, of course, the health and welfare of our patients and our community. Frequently hospitals consider only care, overlooking the fact that treatment, operations, and so on, only relieve or cure the symptoms of a condition and do not help the community to prevent its recurrence.

Here we have tried to keep in mind first, the comfort and scientific treatment of our patients; second, the belief that any hospital or health center in the South should be an educational center not only for physicians but also for the public. For this reason we use the institution as a meeting place for the County Medical Association, the Nurses' Association, the Community Welfare Association, and the county nurses. The library is open to the personnel. All physicians receive copies of the records of charity cases referred to the hospital.

We realize that if we educate the medical and nursing professions, they in turn will educate the public. Educating the public is the best means of preventing disease. We try to keep before us the ideal that a community needs to be interested in a patient not only when he is with us but before he becomes a hospital problem and after he leaves—so that he will not be obliged to return. It is impossible to separate health from social problems, and hence we work to obtain for our patients whatever they need to help them help themselves, whether it is a well balanced diet, glasses, an artificial limb, or an education.

Spartanburg is on the "fall line" of the Carolinas—the point where the high land drops off to slope toward the sea. In the early



*A ward in the Negro Department*

days the cotton mills came to this district because of the water power; now the streams are harnessed not to mill wheels but to the turbines that make electricity. Throughout the county are the mill villages—each a town in itself with its own churches, schools and stores—to which come families from the back-country districts who have not previously been used to factory life. In the purely agricultural sections about the mill villages, tenant farmers are the rule. Economic depression has fallen on both farmers and mill-workers in the past few years, complicating the heavy burden of typhoid, pellagra, and tuberculosis, which the county shares with the rest of the state.

Against these are ranged the forces of the county health department, headed by the 2 physicians mentioned above, a county dentist, a sanitary director, a director of nurses trained in public health work, and 5 white and 1 colored graduate nurses. The services of a woman physician and the use of a healthmobile have been given to the county by the American Women's Hospitals. A colored physician is employed on a part-time basis for work with the colored residents who comprise about a quarter of the county's population of 123,000. Working with these are 18 industrial nurses employed by the mill owners for the communities; and, through the coöperation of the state and county boards of education, 5 trained nutrition workers (4 white and 1 colored) whose salaries are paid partly out of federal funds, partly by the state and interested individuals and mills.

The work of the county health department includes sanitary supervision of milk and water supplies; and sanitary inspection of schools, camps, barber shops, churches, foodhandling establishments, and private premises; the control of communicable disease through reporting

by physicians; measures for quarantine and isolation; registration and supervision of cases of tuberculosis through regular chest clinics and nursing follow-up, and specific prophylaxis against typhoid, smallpox and diphtheria; supervision and education of some 85 midwives practising in the county; infant, preschool, and school hygiene activities, including the examination each year of all children in one-teacher schools, and of the 1st, 4th, and 7th grades; children in the grade schools with follow-up for the correction of defects and a complete physical examination at the hospital for every high school senior who wishes it, with whatever X-ray and laboratory services are indicated, immunization against typhoid and vaccination. For mothers and "potential mothers"—girls of 16 and over—the department organizes home hygiene classes and Little Mothers' Leagues. It supervises pellagra cases; registers children suffering from orthopedic defects; and carries on an active program of health education, including lectures, motion pictures and health plays, circular letters, pamphlets, health exhibits, and press articles.

In 1930 Spartanburg County appropriated \$17,500 for the county health department and dental program. That year's budget of the department, including income from sales and services, state and federal subsidies for the nutrition program, and money grants from outside organizations, amounted to \$30,792. This figure does not take into account the work of the industrial nurses—an integral part of the county program—whose salaries are carried by the mills, or of the community houses at the mills used by the department as health centers; nor does it include some services utilized by the department but carried in the budget of the Spartanburg General Hospital—laboratory service, for example, or the salary of the county health director, who, as mentioned above, is superintendent of the hospital. The range, variety, and extent of the county work which has been called into being through the modest appropriation of \$17,500 is a tribute both to the economy of the interlocking organization of county hospital and health department and to the administrative skill which enlists and uses effectively the interest of individuals and organizations within and without the county.

In 1930 the department took in \$2,000 from the nominal fees charged whenever possible for antityphoid and toxin-antitoxin administration, and from the sales of dried brewers' yeast as a pellagra preventive to persons who could afford to pay a nominal sum. The salaries of the negro public health nurse and of the part-time negro physician are in part covered by a temporary grant from the Julius Rosenwald Fund. The American Women's Hospitals appropriated

more than \$5,600 to be spent under the department's auspices in educational and preventive work. The Kiwanis Club gave \$500 toward the cost of the crippled children's clinics including provision of braces, special shoes, and plaster casts. The town council and Parent-Teacher Association of Campobello, at the northern end of the county, paid the rent of a Health House or Community Health Center, while the city of Woodruff carried the expense of a health center at the lower end of the county. At each of these a nurse is stationed permanently. In districts other than the two covered by the department's health houses, the community houses of the mills are used for clinics, lectures and the like. The salaries of the 18 industrial nurses working with the department are covered, of course, by the mills, and in many instances mill owners have paid part or all of the expense of a special health project put on by the department in their villages. Aid from the schools and industrial plants amounted to \$3,500 for the year.

Nursing follow-up of cases of tuberculosis within the city is done by the local tuberculosis association, while community organizations such as the Red Cross, Salvation Army, and the like, assist in other special problems. Committees of women are organized in the school districts who arrange for the local school inspections and promote interest in the follow-up of children with defects. After the examination is held, the list of pupils with defects is sent to the school board and by the board to the teachers concerned, the principal of the school, and, if a mill school, also to the superintendent of the mill. Letters are sent to the parents, urging them to have the trouble corrected, and paving the way for the later follow-up by the nurse, if necessary. The director and assistant director devote four evenings a week to health education talks at the community centers, churches, and the like: in 1930 these lectures and motion picture exhibitions reached a total of more than 34,000 persons. One night of the four is given to negro audiences.

Probably no single subject is of greater importance in the preventive campaign broadcast from the hospital throughout the county than that of nutrition, to combat the two serious problems of pellagra and tuberculosis. On the basis of incomplete reporting, it is estimated that there were about 3,000 cases of pellagra in the county in 1930, and the number is believed to have increased here, as elsewhere in the South, during the hard times of recent years. Yet the deaths reported show a decline: 72 in 1927; 51 in 1928; 47 in 1929; 48 in 1930. People now are coming to the nurses and doctors for advice, recognizing the early symptoms and no longer insisting that they are suffering from sunburn or have used too hard soap.

For the past 4 years, the months of February and March have been used for a special campaign against pellagra. Meetings are called of the key groups in the community: the teachers, community workers of the Red Cross and similar organizations; industrial nurses, physicians, home and farm demonstration agents, ministers, club women, representatives of parent-teacher associations, merchants, seedsmen, and so on, at which the program is outlined. To reach those not present at the meetings, a letter is sent to every teacher, preacher and community worker. All of these are urged to arrange talks in the schools and churches and at other meetings on the value of gardens and the need of pellagra preventive foods.

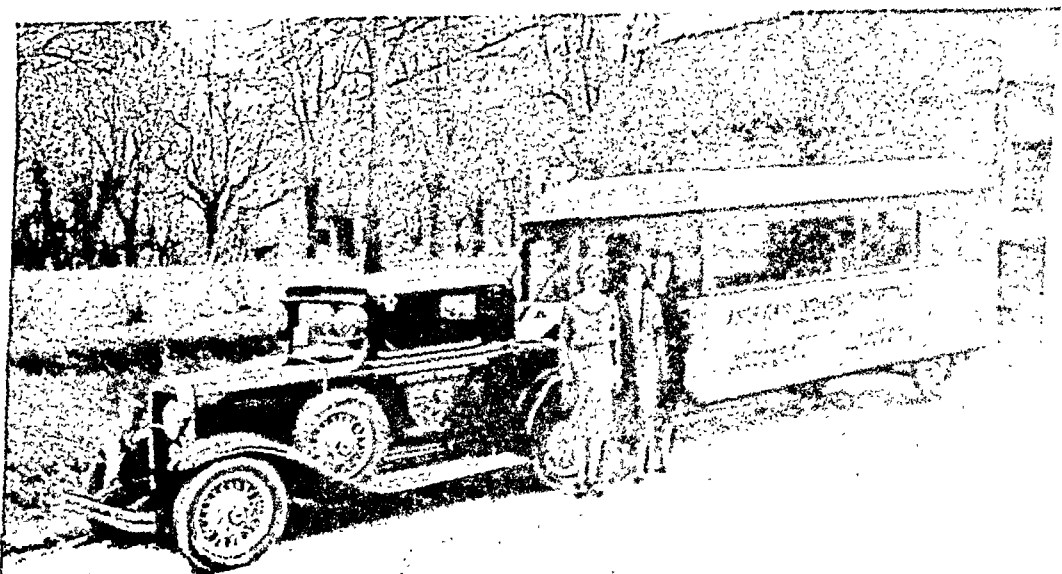
Nurses and club women see to the poster and window displays in post offices, mill offices, and stores. In many instances the industrial nurses have interested the mill owners in having garden space plowed for all who agreed to plant and tend gardens, and have maintained hot-beds for winter gardens. One mill last year had a proud record of 200 gardens. The healthmobile supported by the American Women's Hospitals tours the county visiting all one- and two-teacher schools, while pupils and their mothers go to see the wonders of its tiny kitchen with its gas stove, sink, and electric lights; listen to the talks on pellagra and on general health by physician and nurse; and watch the nutritionist prepare the right food in the right way. In March the 5 nutritionists devote all their time to talks and demonstrations of pellagra preventive foods.

Throughout the year education in nutrition and other aspects of home hygiene is carried on through the clubs for women, girls, and little mothers, of which 20 were organized by the county nurses and 17 by the industrial nurses. The subject, of course, is emphasized constantly in dealing with parents at the well baby, preschool, and school clinics, and in home visits. It is also carried in the simple mimeographed news sheets sent out monthly to teachers and to homes, including those of all farmers in the county with less than 100 acres. Last September's issue of the bulletin and that month's program of nutritionists and nurses were used to stress the planting of winter gardens to give families fresh food through the cold months, but the drought made planting at that time inadvisable, so that a quick turn had to be made and home-canning of present produce emphasized instead. Through special arrangements with the manufacturers, the health department was able to distribute more than 3 tons of brewers' yeast in 1930 at nominal prices, or at need, without charge, through drug stores and at the health centers and the hospital clinics to patients who had a doctor's prescription. "Pellagra is more an educational

problem than a medical problem," Dr. Beeler believes, and as the result of this effort, mobilizing all the forces of the community, the hospital is only rarely called upon to deal with an advanced case.

During 1931-1932 another special project of the department is an intensive 10-month campaign against tuberculosis in one mill village where the disease has shown a high record during the past 5 years, made at the request of the residents, mill owners, doctors, and schools. Family histories have been taken in a house-to-house canvass, including a record of health and heredity, of milk and water supplies, of rooms, beds, and the like. Tuberculin tests have been made of 309 school children and teachers out of a total enrollment of 336, and of 225 workers in the mills and 150 other persons of the community, and all positive reactors then have a complete physical examination, including a chest X-ray at \$3.75 for those who can afford it. Every school child is weighed and measured monthly, and reports are sent to the parents of those who are more than 10 per cent underweight or show other evidence of malnutrition. Classes of the mothers of malnourished children have been organized to make a special study of nutrition, while other classes of women and young girls are studying this and other aspects of home hygiene and child care.

When such special projects as these and the regular activities of the health department have failed to prevent or check illness, or when more intensive examination is required than can be done at the traveling clinics, the patients come in through the social service department to the out-clinics or other services in the hospital. The clinics at the



*The Healthmobile maintained by the American Women's Hospital for the Spartanburg County Health Department*

hospital which in 1930 recorded 1,350 admissions and 2,756 return visits, include as services: medical, surgical, obstetrical, eye, ear, nose and throat, pediatrics, dental, genitourinary, chest, orthopedic, X-ray, syphilological, and psychiatric. The county does not appropriate funds for the out-patient service as such, and except for the social service department, its personnel is part of the hospital force. A nurse from the senior class in the training school serves in the department for 2 months at a time. A clinic fee of \$.25 is charged if the patient can pay it; for syphilis, a treatment fee of \$.50. X-rays are charged at cost if the patient can pay. Nonresidents are not accepted, nor patients who are able to pay for private service or are already under the care of a physician.

In the General Hospital, where white patients are cared for, the full-pay rate for ward beds is \$2.00 a day, while private rooms are from \$3.00 to \$6.00. The social service department, however, has power to fix rates in accordance with a patient's circumstances, or to admit without charge, if the patient is unable to pay. If the family can pay \$.25 a day and no more, that is accepted. Rates in the negro hospital are \$1.00 a day for the wards and to \$3.00 a day for private rooms.

During the present economic stringency patients who could bring farm produce but no money to defray hospital expenses have been permitted to do so, and hams, chickens, fruits and vegetables, and the like, have been credited against hospital bills and added to the current menus, or canned when immediate use could not be arranged. In other instances, arrangements have been made to let unemployed men work out bills incurred by their families by painting, carpentry, and other work under the direction of the hospital's employees.

In 1930 the hospital gave 33,395 days of care at a per diem cost of \$3.86. The daily cost at the tuberculosis unit is \$2.42 and at the negro unit, \$2.05. Thirty-eight per cent of the patients were cared for without charge. The total expense of the hospital for the year was \$141,315. Receipts from in-patients and out-patients and miscellaneous receipts amounted to \$62,749; endowment income, \$7,107; subsidy from the Duke Endowment, \$15,194; county funds, \$54,000. During the past 6 years, reorganization within the hospital, the establishment of the social service department and of a dietetic department under a trained director, and increased volume of care have resulted in marked economies to the county.

In the General Hospital the patient day cost has been reduced from \$6.63 to \$3.86; the average cost per meal from \$.42 in 1925 to \$.27 in 1930. In 1925 the average monthly pay roll, with a daily average



of 34.7 patients, was \$2,600; in 1930, with the personnel serving the group of institutions with a daily average of 92 patients,\* the monthly pay roll was \$3,700. In 1925, the General Hospital gave 11,665 patient-days of care at a cost to the county of more than \$86,000; in 1930, 35,995 patient-days at a county cost of \$45,000.

Land, buildings and equipment of the institution represent a capital valuation of \$728,676. The Duke Endowment Fund gave \$67,500 and the Julius Rosenwald Fund \$40,000 toward the costs of the Tuberculosis Unit, Negro Hospital, and the Out-Patient Building, erected during 1930 (which also houses the social service department, county health headquarters, and isolation unit). The total cost of the three buildings was \$296,000. The furnishing of the new buildings was largely by gifts from the community.

As a county institution, the Spartanburg General Hospital is governed by a board of 9 trustees appointed by the governor upon recommendation of the members of the county legislative committee. In his hospital capacity, the superintendent is directly responsible to this board; as director of the county health department, he is responsible to the county board of health, which includes representation of the county boards of finance and education, and representative citizens.

The hospital is registered by the American College of Surgeons and the American Medical Association and accredited for internships, and its nursing school is accredited by the state board of examiners. The resident staff includes a house physician and 3 internes; the nursing personnel, 8 graduate and 56 student nurses. The laboratory which in 1930 made 10,353 examinations for in-patients, 31,600 for out-patients, is directed by a physician assisted by a laboratory technician and 2 student technicians. The X-ray department is in charge of a member of the medical staff, assisted by a technician and student technician. There is a well organized medical staff of 31 members, an associate staff of 3 consultants in orthopedics, psychiatry, and preventive medicine (in which the superintendent of the hospital serves as a consultant in psychiatry and the director of the tuberculosis unit as consultant in preventive medicine), and a visiting dental staff of 14 members. Relationships with physicians in the county are cordial and active in the work of both hospital and health department.

Through the use of a common personnel, the interest and zeal of its officers, ingenuity in stimulating self-support in patients, and

\* The General Hospital of 130 beds had an average daily occupancy of 92, the Negro Hospital of 20 beds an average occupancy of 21 beds, and the tuberculosis hospital, where 37 beds were available, an occupancy beginning in October, an occupancy of 34. With these three hospitals the total hospital occupancy in the county during 1931 was 38 per cent of the beds available for use, as compared with 25 per cent in 1925. It is impossible to use in full the facilities of the tuberculosis and Negro hospitals.

coöperation with groups both within and without the county, Spartanburg County has achieved a center for medical care and training, for preventive work and community education which would be unusual in far richer sections of the country, and represents a remarkably effective use of the limited resources available locally. By personal knowledge of the communities they serve, the staff and officers of the hospital are able not only to understand the social and economic as well as medical problems that their patients present, but also the measures that will forestall future burdens on both individual families and on the county.

Aside from the training within its walls, the center is doing a valuable educational work in the training of nurses and other members of its personnel to inter-relationships of medical care and social supervision in community and institution. Its usefulness will be further broadened as development of the work for negro patients makes it possible for the Negro Hospital and extramural work to serve more generally for the training of members of that race. The Spartanburg General Hospital and the services coördinated through its direction represent a most unusual and promising example of the three-fold service of modern medicine to the community—prevention, care, and education.

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## Administrative Practice in Scarlet Fever

AS of 1930, a detailed examination has been made of the isolation and quarantine requirements for scarlet fever in 44 of the larger cities of the United States. In many instances the regulations are decidedly confused and often indefinite. There is also a lack of uniformity in principles involved. There should be prepared minimal restrictions compatible with safeguarding the public health. There is need for clarification of terms and better understanding of the technics involved. Also, uniform terminology would permit progress through comparison of experiences. Evaluation of the bacteriological methods now in vogue, the effect on the communicability of scarlet fever, of degrees in type of disease, age of patient, and geographical and seasonal variations are only a few of the relationships to be determined.—George B. Darling and John E. Gordon, *American Administrative Practice in the Control of Scarlet Fever. J. Prev. Med.*, 6:185 (May), 1932.

# Public Health Aims and Professional Services of Nursing

During Infancy, Preschool, and School Ages \*

HORTENSE HILBERT, R.N.

*Staff Associate on Nursing, American Child Health Association,  
New York, N. Y.*

REASONABLE functions and services of nurses in relation to a public health program during infancy, preschool and school ages are:

## INFANCY

The general public health aim is no longer restricted to prevention of infant deaths and illnesses. To get for the child during this period and later childhood the best possible chance for complete health is the whole purpose. Healthy infancy naturally presupposes good prenatal, intrapartum and postpartum care. During infancy, continuous, systematic medical supervision followed by home supervision and parent instruction are generally considered to be the most important provisions. In securing these the public health nurse contributes the following services:

She helps to get as many as possible of the new-born infants of her community under health supervision. This is comparatively easy through birth reports. Mothers, too, are most approachable at this time.

She urges placing babies under the continuous systematic care of a physician. Whether this medical supervision comes from organized centers or private practitioners depends in each case on what the community has to offer the economic group which the particular family represents. Sometimes organized centers serve the purpose of getting the mother accustomed to well baby service so that she will want it and get it from her physician later as a matter of course. In many cities the eligibility ratings for free or semi-pay care from organized sources are so definitely determined that choice becomes automatic. Usually, however, a considerable degree of guidance in these matters devolves upon the public health nurse.

That she interpret and supplement the physician's instructions verbally or by demonstration in the home, is as a matter of course taken to be the job of the public health nurse if the mother goes to a health center. If advice is given privately by the physician, she may give the same service if desired by the mother and requested and approved by the physician in question.

\* Read before the Child Hygiene Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 15, 1931.

She helps to influence the mother's attitude toward breast feeding if the medical opinion of the community indicates this to be desirable.

She helps the parents to establish a suitable routine for the child's day, emphasizing always its importance for the establishment of good health habits later.

She teaches the principles of protection against communicable disease and emphasizes the physician's advice regarding vaccination and diphtheria immunization.

Here as everywhere in public health, what can be done in the way of direct individual instruction counts the most.

The public health nurse has opportunities and obligations for general education of the public as to what constitutes adequate community provisions for infant care; as to what standard of care mothers have a right to expect and will, therefore, demand. Such public opinion is indispensable for attaining the highest standards and completest resources.

#### PRESCHOOL AGE

The public health nurse urges the continuance of systematic health supervision by the physician where it has begun in infancy. Where not, she naturally tries to get it started. Unfortunately, supervision often is not begun until children are ready to go to school, because in many places there are no organized health programs except the school program which is extended to include entrants into school or kindergarten.

The emphasis at this time is mostly on early correction of defects and immunization. The public health nurse tries through visits to the home to convince the parents of the reasonableness of the physician's recommendations. She tries, too, to tie up proper community facilities existing for each child with its family.

Problems during the preschool period, although they include physical care, become more and more psychological. The public health nurse, therefore, is expected to interpret the principles of child psychology and child training and to be effective must know parental education methods.

#### SCHOOL AGE

Public health nursing for children of school age is looked upon as a special branch because it is often administered by a non-health agency, the school. As a matter of fact, the services of so-called school nurses in the past have been confined to comparatively unimportant routine, mechanical duties within the school, which can hardly be called public health nursing. Public health nursing to children of this age is no different in its aims or services than to other age groups.

Children of this age happen to spend a large part of the day in a special environment—the school. The public health nurse adapts the principles and practices of public health nursing to another environment besides the home. She considers another group of persons besides the parents, namely, the teachers who share the responsibility of care and guidance of the children. Her supreme objective is to help educate children directly and through parents and teachers, how best to use the facilities which are part of their community, to make and keep themselves well, not only as school children but later as adults. Her contributions, however, must be consistent not only with the public health provisions of the community but with the general educational objectives of the school as well.

In the school the public health nurse's services can reasonably include the following:

Where health examinations are made by physicians, she assists so as to be intelligent about the physical status of each child, to interpret findings to parents and teachers, and to make plans for the child's improvement. She also supplies to the physician what information she has about the pupil and his environment.

Where there are no medical examinations the nurse may make periodic, individual inspections of pupils. This process of screening may be quite effective when carried on by one who has had much opportunity for observation of physical signs during her hospital experience. It is not necessary to be a high-powered or even an amateur diagnostician to be a very useful detector.

In places where it is not possible for physicians or nurses to hold regular inspections of pupils at reasonable intervals, it is quite clear that the teacher, who is with the children continuously, should be prepared to develop her powers of observation in regard to conditions which need attention. A nurse as a rule does a much better job when she uses her time in helping the teacher, by demonstration and otherwise, than in trying to do the inspections herself, alone. It is still necessary for teachers to learn on the job many of the things which we hope they will ultimately take over as a matter of course. The nurse is apparently at present one person to guide the teacher in health practices.

Advisory conferences with pupils, teachers and parents often have as their outcome good plans for the future health of the child. Conferences with parents in school are not to be regarded as substitutes for home visits, but as supplementary to them, for familiarizing the parents with the health plans of the school. Teacher-nurse conferences for discussion of all health aspects of the school program should be encouraged frequently and regularly.

Everyone realizes, of course, that the inspection, whether by physician, nurse, or teacher, is more than a procedure for finding out what is wrong. It is fully justified only when used as a means of giving personal, individual health instruction, then and there, and later, to the child, to the parent and to the teacher, and to guide in

the use of health resources of the community. The nurse may strengthen and emphasize individual instruction of this kind through group instruction, to bring out points which have been covered in the daily health education processes of the teacher, if any; if not, to stimulate the teacher's interest in such continuous processes.

Special inspections should include:

*Inspections of children returning to school after illness*—This inspection and subsequent readmission may be made by principal or teacher, usually upon written permission from the attending physician or health officer. The nurse has an educational function to perform in impressing parents with the importance of keeping the child at home when ill, and of calling a physician; in pointing out to teachers that children with sore throats, etc., should be at home, in spite of school attendance records.

*Inspections of children referred to the nurse by the teacher*—These are likely to range from pupils retarded scholastically to scratched hands and scuffed knees. Children are referred by the nurse to proper sources for expert diagnosis and treatment. Cases of minor injuries, scratches, etc., should be discouraged from coming to the nurse. If an accident has occurred in school, the teacher or pupils should be equipped to clean the wound and apply a dressing; if at home, the treatment devolves upon a family member. For emergency care of accidents there should be standing orders from the medical director or board, if there is one. Sometimes standing orders for treatment of scabies, impetigo and pediculosis are obtained so that the nurse's instructions to the parents and pupils are definitely based on a doctor's orders.

*Inspection and exclusion of children for communicable disease*—When communicable disease occurs, it is up to the nurse, where possible, to keep the children in school under her observation during the maximum incubation period through frequent inspections for suspicious signs. She is usually expected to exclude pupils when indicated. The principal and teachers may do it instead. There are various types of legal provisions for this type of inspection and exclusion, and the nurse has an opportunity to function in a teaching capacity toward teacher and principal no matter what the provisions.

Some degree of responsibility for the hygiene of the school environment usually falls to the nurse; in rural districts most of it. It is obviously important that teachers and pupils be made aware of the best use of physical facilities for safeguarding and promoting health at all times. As far as health education, in the sense of curricular activity, is concerned, suffice it to say that all public health nursing services can be made of high educational value as all services of the teacher can be made of high health value.

The public health nurse in school nursing service may be expected actually to participate in the formal teaching program by giving those courses or classes which involve nursing knowledge and technic. She should be able to interpret educational implications in health service to school administrators and teaching staff.

In the home her services for the child of school age are like those for other ages. She interprets instruction to parents and to children as to correction and treatment of defects, control of illness, and promotion of health. Only by thoroughly knowing the home can she help to make intelligent and consistent plans for the child's health.

The nurse must coördinate home and school with all health resources of the community if her work is to be of permanent significance. She consults local medical and dental practitioners, who are the unorganized health resources of the community, to explain to them what the school health program objectives are and to show that they in no way conflict with the prerogatives of private medicine and dentistry—quite the contrary. She solicits the advice of these practitioners in regard to individual needs of school children and the whole school health program.

Where there are no organized resources for health and social service, a good public health nurse can do much to help promote and develop them, not for the school only but for the whole community. If these agencies already exist, complete coöperation with them strengthens not only the agencies but the health service to each school child.

Of paramount importance but often neglected is the establishment of advisory committees representing the school, the health and social agencies, to act in an advisory capacity to the whole school health program, including nursing. It seems of particular usefulness, when it is a board of education service. Here the potentialities of public health service, and type of service reasonable to expect, are often less understood than by health agencies. Understanding can be influenced by an enlightened board or committee. There are other tangible services for such committees which are quite familiar.

Where the public health nurse is expected to include secondary schools in her service, she has the same objectives and functions as she had in elementary schools, although her methods and emphasis are somewhat different. She uses the individual counsellor method more than joint conference or home visit, since the student of secondary school age is gradually becoming more responsible for the care of his own body, the correction of his own health defects and for protecting himself and others against disease. If she understands the manifold psychological problems peculiar to adolescence and is sympathetic with the confusions characteristic of this age, she has a unique opportunity for individual guidance.

At the risk of being tiresome I have gone into what must seem unnecessary detail about public health nursing service for the school

child because there is such variety and confusion of opinion as to what school nursing can reasonably be, and as to how nurses should function in relation to the school. The nurse's services during the preschool period, including infancy, are fairly simple and obvious. When it comes to the school child things seem more complicated because of the probability of non-health agency administration, and because instead of serving directly from health agency or agent to home, the nurse must include another group of individuals, the teachers, and another institution, the school, no matter what the administration under which she functions.

If the nurse can, with the professional equipment which she brings to public health, in any way help realize the general aim of having all children everywhere physically and mentally ready to go to school, and of securing health supervision without break from before birth through adolescence, I feel she will have justified her existence. If she will use her professional equipment to teach what can be done and how to those who have the children under their guidance from day to day, instead of doing for the child what the parent can or should do, she will become a much more potent factor in health education.

If all workers in the field of child health, particularly for school children, had clearly defined aims there could be no haggling over prerogatives and no fears of usurping one another's jobs.

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## Italy's Courses in Child Hygiene

THE National Children's Bureau of Italy has ordered its provincial branches to organize popular courses on maternal and infant hygiene for girls of 16 to 18 years, according to *Maternity ed Infanzia*, of Rome. The courses are to be given preferably in day nurseries and similar child welfare institutions, so that the girls may have practical training as well as theoretical instruction. No diplomas will be awarded in these courses. The granting of diplomas in this subject is restricted to graduates of special courses given for those who intend to take up maternal and infant welfare as a profession.—U. S. Children's Bureau, Washington, D. C.



# Significance of Bone Trabeculae in the Treatment of Lead Poisoning\*

## Lead Studies XVII

JOSEPH C. AUB, M.D., GEORGE P. ROBB, M.D.  
AND ELSIE ROSSMEISL

*Medical Laboratory, Collis P. Huntington Memorial Hospital,  
Harvard Medical School, Boston, Mass.*

IT has been found easier to control the metabolism of lead in the human organism since it was learned that the lead stream runs parallel to the calcium stream.<sup>1</sup> It is now generally agreed that lead is stored in the bones for long periods of time. From this storage place it is gradually liberated, just as calcium is liberated, and therefore may be found in the excreta over a period of months and probably in small quantities for years. This gradual elimination of lead is the result of normal exchange of the inorganic salt content of bone.

In periods of metabolic emergency such as occur during pneumonia, alcoholic debauches, operations, etc., it has been observed that toxic lead episodes develop in individuals exposed to lead but who have previously had no symptoms. In such metabolic emergencies, therefore, the organism may be exposed to an increased stream, which must be derived from the bones. This lead stream can also be liberated, as shown by Aub and Minot,<sup>1</sup> and Hunter and Aub,<sup>2</sup> by using other methods which draw calcium from the bones. Since this treatment was devised, the question has often been asked whether it is preferable to withdraw lead by such therapy or whether it would be wiser to allow it to be excreted in the natural course of metabolic events over a long period of time. The work here reported presents further evidence in favor of removing this stored lead.

Inasmuch as lead metabolism runs parallel to that of calcium, the lead problem becomes essentially a problem of calcium metabolism. In recent work upon the function of bones, Bauer, Aub, and Albright<sup>3</sup> and later, Gyorgy,<sup>4</sup> demonstrated that bone structure could obviously

\* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 15, 1931.

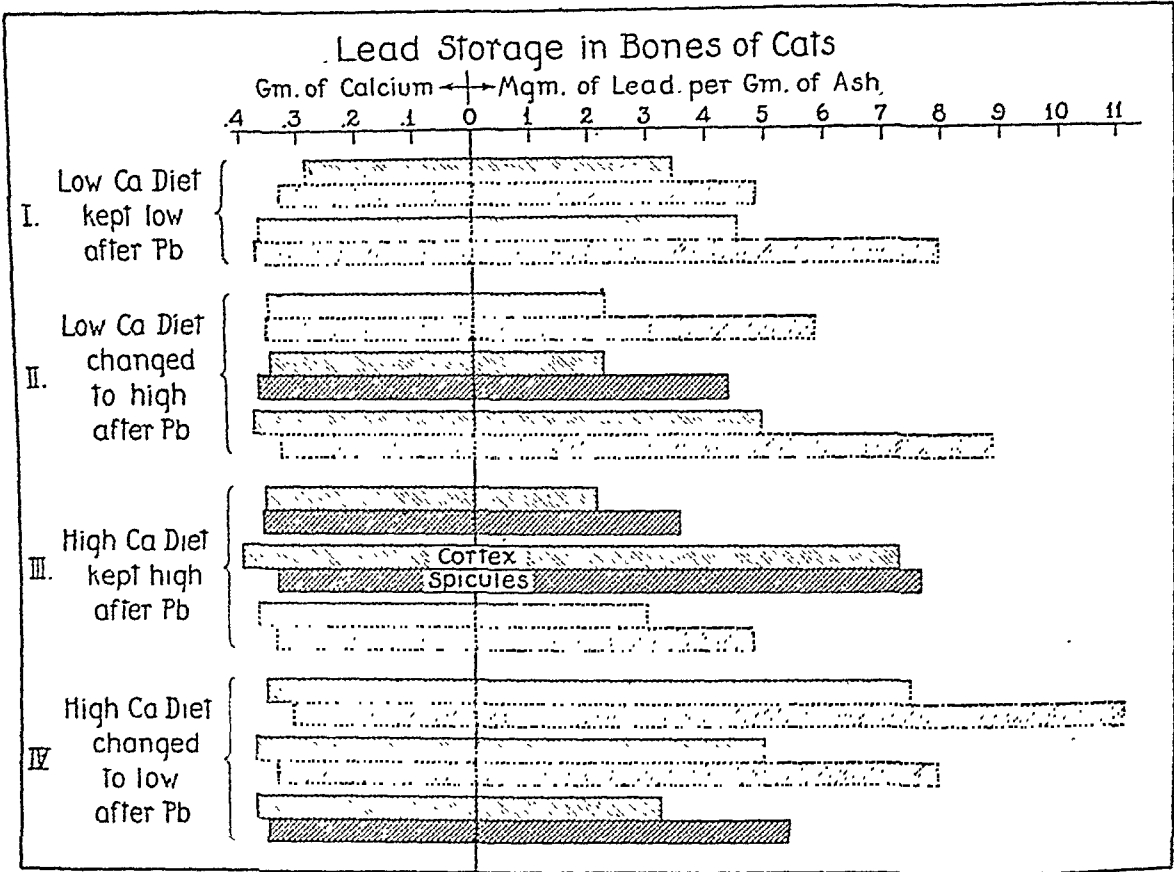


FIGURE I—A graphic presentation of the second group of animals. Both calcium and lead determinations were made in these experiments

be divided into two parts: the hard shaft of the bones needed for body support, and the bone trabeculae which, surrounded by marrow, are concentrated near the epiphyses. These trabeculae serve in large part as the readily available storehouse to supply the body with fixed base for metabolic needs, and they largely disappear when the organism is experimentally depleted of calcium by means of a low calcium diet plus acids or parathormone. We are, therefore, faced by this situation: In the emergencies which sometimes precipitate acute toxic lead episodes, inorganic salts may be withdrawn from the trabeculae of bones. It is, therefore, of interest to know how much lead is stored in these trabeculae.

#### METHODS

Cats were used in this study. Some of them were kept on constant, low calcium diets which consisted of meat, occasionally salmon and liver, and water. Others were on a high calcium diet, which consisted of the same diet with milk in place of the water. Cats will remain in excellent condition on either diet for a period certainly well over a year. After the animals had remained on such a diet for 7 to

9 weeks, approximately 200 mg. of neutralized lead carbonate was injected by syringe directly into the trachea and so allowed to gravitate into the lung. In some of the animals this dose was repeated after several months. After varying lengths of time these animals were killed and autopsied. The long bones were sawed in half and freed from bone marrow by digestion with duodenal content or with purified pancreatic ferment. In this way the bones could be thoroughly cleaned without manipulation. The trabeculae, particularly those at the epiphyseal ends, were then cleaned and separated from the cortex. These were analyzed for calcium and lead. The regular lead analysis, as described by Fairhall,<sup>5</sup> with modification for analysis of the bones as described by Minot,<sup>6</sup> was utilized. Fiske's calcium method<sup>7</sup> was used.

### RESULTS

Fifteen animals were so studied, all of which were killed within 4 months after lead was first administered. The results of the analyses are shown in Table I. No conclusions can be reached in regard to the amount of lead stored in different animals, because the amount of lead which reached the lungs, as well as the amount which was absorbed from the lungs, probably varied considerably. The effects of diet, therefore, are not clear in these observations. The interesting finding is that there was a higher concentration of lead in the trabeculae as compared to the bone shaft in all but one animal, an average increased concentration of 78 per cent. This finding becomes more significant when it is observed that the calcium content of the ashed bone is essentially the same in both places—an average of 365 mg. in the cortex and 350 mg. in the trabeculae per gm. of ash. The increased concentration of lead, therefore, is increased not only relative to the total weight of bone but also in proportion to the quantity of calcium present. It

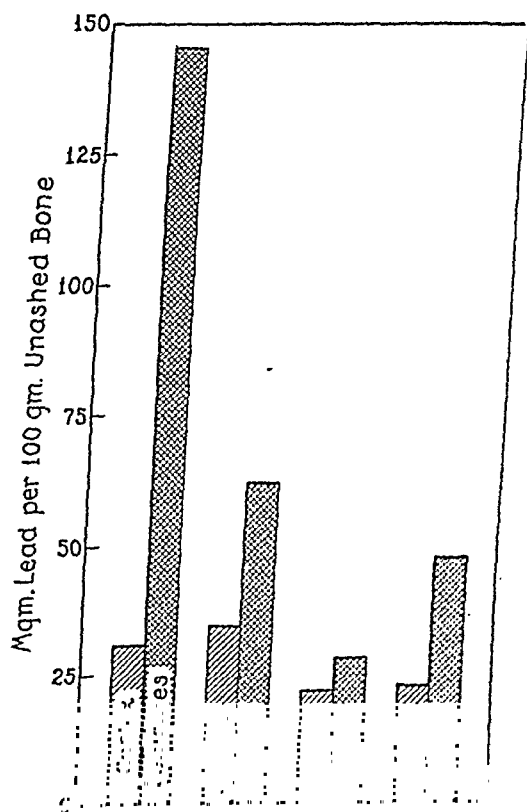


FIGURE II—A graphic presentation of the lead content of the bones in animals 101, 102, 103 and 104

TABLE I.

Animal No.	Ca Intake		Duration of life After Pb	CORTEX				TRABECULAE				Remarks
				Wt. of Bone Sample		Content per Gms. Ash		Wt. of Bone Sample		Content per Gms. Ash		
	Before Pb	After Pb		Before Ashing gms.	After Ashing gms.	Pb mgm.	Ca gms.	Before Ashing gms.	After Ashing gms.	Pb mgm.	Ca gms.	
101	Low	On Low for 7 da. Then High	66 days	3.949				2.097	1.257	0.967		2 inj. of Pb, Apr. 20 & June 15. Died 10 da. after 2nd inj.
102	Low	High	97 days	3.928	2.613	0.494		2.800	2.027	2.007		2 inj. of Pb, Apr. 20 & June 15. Killed 41 da. after 2nd inj.
124	Low	High	4 mo. 12 days	23.641	15.845	0.229	0.354	5.532	2.620	0.586	0.359	2nd inj. of Pb after 4 mos. Killed 12 days later.
128	Low	High	1½ mo.	24.900	16.890	0.225	0.351	5.060	2.410	0.438	0.373	Died 1½ mos. after Pb inj.
148	Low	High	4 mo.	19.495	12.555	0.494	0.382	3.965	2.055	0.888	0.336	Killed 4 mo. after Pb inj.
103	Low	Ate nothing	17 days	7.083	4.898	0.329		4.339	2.295	0.891		Died 18 days after Pb inj.
104	Low	Low	97 days	5.311	3.545	0.310		7.561	4.119	0.529		2 inj. Apr. 20 & June 15. Killed 41 days after 2nd Pb inj.
129	Low	Low	2 mo.	23.545	15.320	0.345	0.287	7.805	3.450	0.488	0.331	Died 2 mo. after Pb inj.
130	Low	Low	4 mo.	23.350	15.397	0.456	0.369	5.598	2.506	0.798	0.375	Killed 4 mo. after Pb inj.
126	High	High	12 days	27.135	18.574	0.211	0.362	1.432	1.177	0.354	0.367	Died 12 days after Pb inj.
134	High	High	21 days	14.674	9.305	0.725	0.404	8.430	3.280	0.761	0.342	Died 21 days after Pb inj.
154	High	High	4 mo. 12 days	27.166	18.206	0.299	0.378	4.795	2.240	0.478	0.348	2nd inj. of Pb after 4 mo. Killed 12 days later.
127	High	Low	1½ mo.	27.039	18.130	0.742	0.362	6.026	2.820	1.106	0.319	Died 1½ mo. after Pb inj.
140	High	Low	4 mo. 12 days	22.620	14.605	0.494	0.383	6.065	2.665	0.791	0.345	2nd inj. after 4 mo. Killed 12 days later.
149	High	Low	5 days	11.000	7.134	0.319	0.381	1.476	0.666	0.536	0.360	Died 5 days after inj.

is clear that in these animals lead was present in greater concentration just where it offered the greater danger, for it was stored in relatively large quantities in the areas which liberate inorganic salts when these are needed for the metabolism of the body.

A confirmatory observation was found in children. In a case of fatal lead poisoning, already reported by Dr. Edward C. Vogt,<sup>8</sup> we analyzed the bones for lead and calcium. The cleaned bones were divided into three parts: the dense area at the end of the bone, the spicules from the medulla, and the hard cortical bone. The analyses

of the second series were obtained from the bones of a child who died from appendicitis. X-ray studies had demonstrated a "lead line" in the bones, but the history disclosed no symptoms of lead intoxication. The analyses are shown in Table II. It is clear that the lead

TABLE II.

Area	Weight of Bone Analyzed gms.		Lead per Gm. of Bone mgm.		Calcium per Gm. of Bone gms.	
	Case I	Case II	Case I	Case II	Case I	Case II
Cortex	3.605	7.8409	0.122	0.124	0.202	0.234
Medullary Spicules	2.860	2.3819	0.178	0.313	0.133	0.228
Metaphyses	3.652	2.2662	0.527	0.243	0.124	0.214
Epiphyses		4.5123		0.203		0.204

concentration, particularly in relation to the calcium, is far greater in the areas where bone growth is occurring and also in the trabeculae. The work of Dr. Vogt further shows that, in spite of removal from lead exposure, the dense shadows where the greater amount of lead is present move onward with the epiphyseal line. This indicates dissolving of the lead in its original area of deposit and redepositing of it in areas of bone growth—an obvious source for a continuous lead stream.

#### DISCUSSION

Previous experiments have indicated that the bone shafts, in all probability, metabolize at a fairly constant rate without much influence from acute metabolic variations, while inorganic salts in the trabeculae are easily liberated. The therapy of "deleading" described some years ago by Aub and Minot<sup>1</sup> also strikingly reduces the number of bone trabeculae. The experiments here reported indicate that there is a relatively large deposit of lead in these areas of bone which most readily respond to metabolic change, and it is this lead which therapy probably liberates in increased amounts in the excreta. It is clear, however, from Vogt's X-ray studies that, in children at least, not all this lead is excreted but that as bones grow it is liberated and then redeposited along the areas of growth.

From the point of view of therapy of lead poisoning, it seems clear that it is better to have the patient relatively free from lead in areas which may readily allow it to circulate. This evidence, therefore, seems further to establish the value of deleading. To be able to liberate some readily available lead and then to replace this with uncontaminated calcium salts would seem to be obviously desirable.

### CONCLUSIONS

Lead stored in the bones is present in higher concentration in the trabeculae than it is in the cortex.

In children it is present in the highest concentration in the areas where calcium is being most rapidly deposited.

The practical value of these observations, indicating the value of accelerating lead excretion, is discussed.

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# Seasonal Incidence of Whooping Cough in the United States\*

G. E. HARMON, M.D., F.A.P.H.A.

*Department of Hygiene and Bacteriology, School of Medicine,  
Western Reserve University, Cleveland, O.*

THE seasonal incidence of whooping cough has been studied and discussed by many epidemiologists. Hirsch<sup>1</sup> states that for certain European countries and cities the maximum seasonal incidence of whooping cough occurs in the autumn (September, October and November) or in the spring (March, April and May). Crum<sup>2</sup> states that for Aberdeen, Scotland, New York City and Philadelphia the attack rate is highest in the spring and lowest in the autumn. Luttinger,<sup>3</sup> who dealt with data relating to New York City, considered the relation of whooping cough to season paradoxical because its greatest prevalence occurred during the spring and summer rather than during the fall and winter when respiratory infections are most prevalent. He pointed out that the curves of the seasonal incidence more nearly coincide with those of the diarrheal than with those of the respiratory diseases.

In a study of the epidemiology of whooping cough in Cleveland, the author<sup>4</sup> presented data for 1906-1916 which showed that the disease had its greatest incidence in the spring and early summer. Godfrey,<sup>5</sup> who speaks of whooping cough as an epidemiological anomaly, gives the monthly incidence for New York State for 1913-1917, and shows that the peak of maximum incidence falls most frequently in the winter months. He found no evidence of a distinctive summer increase.

Collinson and Councell<sup>6</sup> have recently published data for Maryland for 1921-1929, from which it appears that the percentage monthly incidence of whooping cough for that state is maximal during March, April, May, and July. While the conclusions of the investigators cited may be summarized in the statement that the peak of the incidence of whooping cough tends to fall in the spring or early

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summer months, still there is evidence that variations from this type of distribution are not infrequent.

Since 1922, the monthly incidence of whooping cough for a number of states has been published in *Public Health Reports*. An analysis of these data was undertaken to determine the type or types of the seasonal distribution which were occurring in the United States. Since the author <sup>7, 8</sup> pointed out that the peak of the seasonal prevalence of diphtheria, measles, scarlet fever, and typhoid fever occurs earlier in the south than in the north, the data were analyzed with the idea of determining also whether a given type of distribution was associated with a definite geographical or climatic area.

TABLE I  
WHOOPING COUGH MORBIDITY AND MORTALITY  
BY STATES, 1922-1929

States	Total Cases	Total Deaths	Fatality Rate	State	Total Cases	Total Deaths	Fatality Rate
1	2	3	4	5	6	7	8
Vermont	13,264	189	1.4	Maryland	29,042	1,258	4.3
Wisconsin	56,262	911	1.6	Pennsylvania	119,213	5,160	4.3
Mississippi	100,061	1,690	1.7	Maine	10,708	546	5.1
Kansas	25,948	700	2.7	Oregon	4,067	223	5.5
Washington	15,285	425	2.8	North Dakota	4,038	231	5.7
Dist. of Columbia	6,002	176	2.9	Minnesota	13,844	911	6.6
New York	139,315	4,163	3.0	Nebraska	4,948	447	9.0
North Carolina	88,722	2,664	3.0	Missouri	20,909	1,994	9.5
Connecticut	21,788	681	3.1	West Virginia	15,750	1,607	10.2
New Jersey	55,190	1,684	3.1	Tennessee	16,328	1,892	11.6
Illinois	79,647	2,620	3.3	Arkansas	9,054	1,101	12.2
Massachusetts	63,125	2,101	3.3	Florida	4,336	529	12.2
Michigan	59,831	2,024	3.4	Alabama	12,941	2,175	16.8
Ohio	85,000	3,310	3.9	Louisiana	4,987	1,425	28.6
California	52,408	2,213	4.2				

The study was restricted to those states which had a total of 4,000 cases or more reported during 1922-1930, and for which morbidity data had been published for each month of the period. Twenty-nine states listed in Table I, meeting these requirements, were included. It should be borne in mind that because of incompleteness of reporting, the data used represent only a sample of the total cases occurring in any individual state, and that the relative size of this sample varies as between the different states. Sydenstricker and Hedrich <sup>9, 10</sup> found that in Hagerstown, Md., 30.5 per cent of the cases of whooping cough seen by physicians were reported, and only 16.8 per cent of all



cases were reported. Green and Moorehouse<sup>11</sup> stated that 78 per cent of the deaths from whooping cough that occurred in Cleveland during 1923–1928 had been reported previously as cases.

While it is recognized that the case-fatality rate depends upon many factors, and therefore may not be an accurate index of completeness of reporting, fatality rates are presented in Table I (columns 4 and 8) to serve as a rough comparative index. The period covered by this table does not include 1930 because information in regard to deaths was not available. It is believed, since there is no evidence that physicians report cases of whooping cough more completely at one season than another, that the data used may be taken as a random sample of all the cases that occurred, as far as seasonal distribution is concerned. The samples available were also considered to be large enough to give a reliable indication of seasonal distribution.

A time series for 1922–1930 composed of the numbers of cases of whooping cough reported in successive months, adjusted throughout to a month of 31 days, was set up for each state. Each series was followed through, and for each complete yearly swing or wave the month of maximum incidence and the month of minimum incidence were noted. In this procedure all yearly waves were included without regard to whether they were epidemic or non-epidemic in character. From Table II (columns 2 and 6) it will be seen that, when all states are considered, March appears most frequently as the month of maximum incidence, and October as the month of minimum incidence. It is during the first 7 months of the year that months of maximum incidence most frequently occur, while it is during the last 4 months that we find most commonly months of minimum incidence. Comparing the northern group of states (Connecticut, Massachusetts, Maine, Michigan, Minnesota, New York, North Dakota, Wisconsin, and Vermont) with the southern group (Alabama, Arkansas, Florida, Louisiana, Mississippi, North Carolina, and Tennessee), Table II indicates that while the month of minimum incidence in both groups occurs at about the same time of year, the month of maximum incidence tends to come earlier in the northern than in the southern group.

This rough method of analysis gives no idea concerning the shape of the curve which depicts the monthly distribution of cases throughout an entire year. In order to obtain information on this point the distribution of cases by months for a year of median—that is typical—incidence is desirable. The method adopted for obtaining such a year is that discussed by the author<sup>8, 12</sup> in outline as follows:

October being most frequently the month of minimum incidence, the so-called epidemiological year was considered to run from October

TABLE II

FREQUENCY DISTRIBUTION OF THE MONTHS OF MAXIMUM AND MINIMUM  
INCIDENCE OF WHOOPING COUGH, 1922-1930

Month	Maximum Incidence			Month	Minimum Incidence		
	Twenty-nine states	Nine northern states	Seven southern states		Twenty-nine states	Nine northern states	Seven southern states
1	2	3	4	5	6	7	8
Oct.	3	3		Mar.	4	3	
Nov.	6	4		Apr.	4	3	
Dec.	5	4		May	4		
Jan.	35	18	4	June	10	8	
Feb.	21	5	5	July	5	3	1
Mar.	46	13	14	Aug.	18	8	3
Apr.	36	6	14	Sept.	47	14	12
May	39	7	13	Oct.	95	28	24
June	28	6	6	Nov.	32	3	10
July	25	4	7	Dec.	37	10	11
Aug.	10	6		Jan.	3		1
Sept.	6	4		Feb.	1		1
Total	260	80	63	Total	260	80	63
Most frequent month	Mar.	Jan.	Mar. & Apr.	Most frequent month	Oct.	Oct.	Oct.

1 of one year, to September 30 of the next. The time series representing the monthly incidence of whooping cough for each state included 8 such epidemiological years, from October 1, 1922, to September 30, 1930. Each month was then treated independently. For any state, for example, the figures representing the incidence of the 8 Octobers respectively were placed in an array and a central value determined by means of parabolic smoothing. The data for the other months were treated in a similar way. The 12 central values thus obtained (really approximations to the monthly median incidence in each case) were added together and the total considered to represent for the period involved a year of median incidence. The median incidence for each month was next expressed as a percentage of this total. The 12 percentages thus obtained indicate the seasonal

distribution of cases in a year of median incidence and when plotted give a seasonal curve which may be regarded as typical. The results for each state are presented in Tables III, IV, and V.

TABLE III  
PERCENTAGE DISTRIBUTION OF WHOOPING COUGH BY MONTHS FOR A YEAR  
OF MEDIAN INCIDENCE FOR CERTAIN STATES AND GROUPS OF STATES

Month	Group I					Group II					Not grouped			All 29 states com- bined
	Conn.	N. J.	N. Y.	Pa.	States com- bined	Me.	Mass.	Nebr.	W. Va.	States com- bined	D. C.	N. D.	Vt.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Jan.	12.7	10.3	10.0	9.3	9.1	10.9	12.2	7.7	11.6	11.8	7.9	6.9	12.0	9.0
Feb.	9.5	9.4	10.3	10.1	10.0	12.9	11.5	12.1	9.7	11.6	8.6	10.8	10.7	10.0
Mar.	9.6	9.3	10.1	10.2	9.9	12.1	12.3	11.5	12.7	12.2	10.6	9.4	7.8	10.9
Apr.	9.1	8.8	9.5	8.6	9.7	8.7	10.4	9.8	10.3	10.0	7.9	10.2	9.1	10.4
May	7.7	8.7	9.0	8.0	8.7	8.3	9.6	11.0	9.6	8.8	9.6	8.7	5.1	9.9
June	7.3	8.8	8.1	7.8	8.6	5.7	7.9	7.8	9.4	7.3	8.3	10.6	7.2	9.4
July	7.8	8.7	8.0	8.8	8.4	6.7	6.5	9.1	9.5	6.6	10.2	7.3	6.2	8.5
Aug.	7.0	7.1	6.9	8.4	7.2	3.9	5.2	7.4	7.7	5.4	6.9	7.9	4.0	7.0
Sept.	6.3	6.2	6.5	7.8	6.6	4.9	4.8	7.8	4.6	5.6	6.1	9.6	5.7	5.9
Oct.	6.3	6.0	5.9	6.4	6.1	7.2	4.3	4.3	3.9	5.3	7.5	7.7	8.4	5.5
Nov.	8.9	8.0	7.7	7.4	7.7	9.7	6.6	6.4	4.6	7.1	6.5	6.4	11.6	6.5
Dec.	8.1	8.7	7.9	7.4	8.1	9.0	8.6	5.1	6.3	8.3	10.0	4.6	12.4	6.9
Max. month	Jan.	Jan.	Feb.	Mar.	Feb.	Feb.	Mar.	Feb.	Mar.	Mar.	Mar.	Feb.	Dec.	Mar.
Min. month	Sept. Oct.	Oct.	Oct.	Oct.	Oct.	Aug.	Oct.	Oct.	Oct.	Oct.	Sept.	Dec.	Aug.	Oct.
Total cases	2,438	6,857	18,031	15,017	43,356	1,396	8,155	652	1,908	12,678	521	520	1,539	146,329

The various time series were next combined to obtain a composite time series representing the incidence of whooping cough in all 29 states. The percentage monthly distribution of cases for a year of median incidence for this series is given in Table III, column 15. The corresponding curve is shown in Graphs I and II. From the percentages and the graphs it appears, when all the states are considered as a unit, that the maximum incidence occurs in March and the minimum incidence in October. It was thought, however, that the states might be classified according to type of seasonal curve and that some of these types might differ from the general type curve characteristic of all states combined.

When a classification of individual states upon this basis was attempted, it was found that with the exception of the District of Columbia, North Dakota, and Vermont, all fell in one or another of 4 groups. Seasonal curves for Connecticut, New Jersey, New York,

TABLE IV

PERCENTAGE DISTRIBUTION OF WHOOPING COUGH BY MONTHS FOR A YEAR OF  
MEDIAN INCIDENCE FOR STATES OF GROUP III

Month	Ala.	Ark.	Calif.	Fla.	La.	Minn.	Miss.	N. C.	Ore.	Wash.	States com- bined
1	2	3	4	5	6	7	8	9	10	11	12
Jan.	7.9	5.5	7.0	5.1	6.0	8.0	7.3	6.8	5.0	5.8	7.4
Feb.	9.1	8.7	8.5	9.1	9.1	8.6	10.5	9.5	7.2	9.1	9.5
Mar.	9.6	10.3	11.0	13.3	9.5	11.9	11.6	11.0	7.6	12.9	11.5
Apr.	11.1	11.7	12.8	14.5	12.3	11.0	13.6	11.6	13.0	14.9	12.6
May	12.3	11.9	16.0	17.3	13.5	11.9	12.1	12.9	20.0	15.7	12.8
June	12.5	12.0	11.3	12.6	12.1	8.7	11.8	12.2	13.7	10.9	11.3
July	11.0	10.8	8.5	7.4	10.1	7.5	7.7	10.8	9.4	9.7	8.7
Aug.	7.1	8.8	6.4	5.7	6.9	7.1	5.1	7.0	7.6	7.2	6.0
Sept.	4.4	4.0	5.4	5.5	5.4	6.3	4.8	4.8	5.0	3.4	4.9
Oct.	5.2	5.0	4.0	2.5	3.6	6.3	4.3	4.7	4.1	3.6	4.9
Nov.	4.3	4.4	4.6	3.8	5.6	6.6	5.5	4.5	3.9	3.8	5.3
Dec.	5.4	7.0	4.5	3.2	6.0	6.1	5.8	4.1	3.5	3.0	5.2
Maximum month	June	June	May	May	May	March & May	Apr.	May	May	May	May
Minimum month	Nov.	Sept.	Oct.	Oct.	Oct.	Dec.	Oct.	Dec.	Dec.	Dec.	Oct. & Sept.
Total cases	1,739	1,049	7,251	526	504	1,724	12,935	10,688	460	1,991	39,862

and Pennsylvania were similar in that they were of low amplitude, were high during January, February, March, and April, and low during August, September, and October. These states comprise Group I. Curves for Maine, Massachusetts, Nebraska, and West Virginia (Group II) were found to have a greater amplitude but otherwise they resemble those of Group I. Data in Table III and Graph I make it possible to compare the curves for each of these groups with that for the 29 states combined. It will be noted that the curve for the 29 states combined is highest during February, March, April, and May, the period of high incidence occurring later in the year than is the case for either Group I or Group II. In interpreting Table III, and also Tables IV and V, it is to be remembered that the figures represent a median or are based upon a median. The characteristics

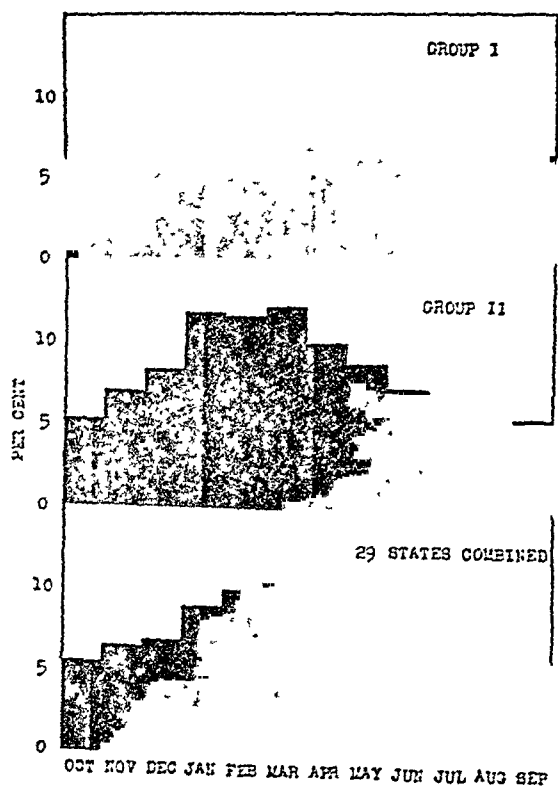
TABLE V  
PERCENTAGE DISTRIBUTION OF WHOOPING COUGH BY MONTHS FOR A YEAR OF  
MEDIAN INCIDENCE FOR STATES OF GROUP IV

Month	Ill.	Kans.	Md.	Mich.	Mo.	Ohio	Tenn.	Wis.	States com- bined
1	2	3	4	5	6	7	8	9	10
Jan.	9.3	7.8	8.3	8.5	6.2	9.4	8.4	8.5	9.0
Feb.	9.5	10.0	9.0	9.1	8.9	10.5	10.9	9.1	9.5
Mar.	9.8	10.7	10.0	8.7	11.2	9.2	10.2	9.2	9.6
Apr.	9.0	9.8	8.9	8.8	9.7	8.9	10.3	9.2	9.1
May	8.7	8.4	9.1	10.1	10.2	9.3	8.8	7.3	9.0
June	9.3	13.0	10.0	10.2	11.2	10.2	13.2	6.5	9.7
July	9.6	10.2	11.4	10.2	11.4	11.0	10.4	9.4	9.9
Aug.	7.8	6.6	7.6	9.2	7.0	8.6	5.7	10.2	8.4
Sept.	6.3	5.3	5.6	7.3	6.1	5.9	6.1	8.6	6.8
Oct.	6.0	5.5	6.0	5.2	6.0	4.9	5.4	5.9	5.7
Nov.	7.0	7.4	7.4	6.4	7.5	5.8	4.8	8.7	6.6
Dec.	7.8	5.4	6.8	6.4	4.6	6.3	5.7	7.5	6.7
Maximum month	Mar.	June	July	June & July	July	July	June	Aug.	July
Minimum month	Oct.	Sept.	Sept.	Oct.	Dec.	Oct.	Nov.	Oct.	Oct.
Total cases	10,041	3,410	3,585	7,431	2,519	9,766	1,731	7,076	46,785

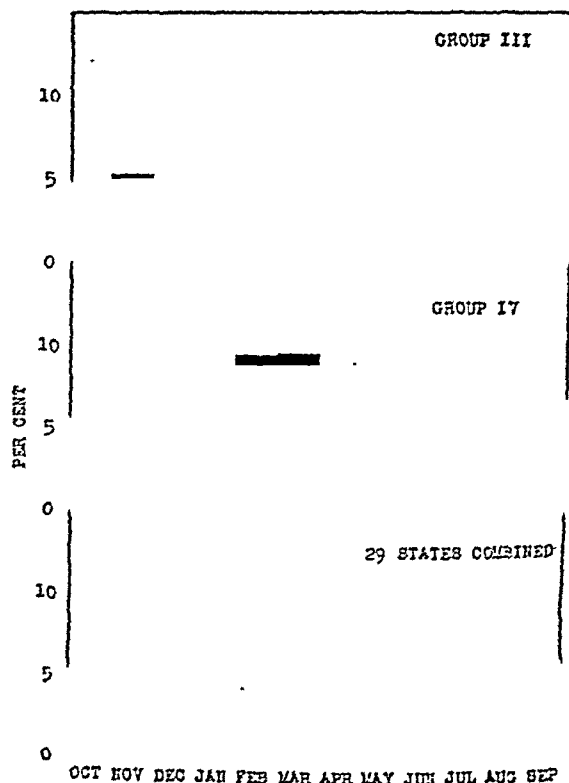
of this average are such that the median number of cases for a group of combined states is not necessarily equal to the sum of the median number of cases of the individual states included.

Alabama, Arkansas, California, Florida, Louisiana, Minnesota, Mississippi, North Carolina, Oregon, and Washington fall into Group III. The seasonal curve for each of these states is high during April, May, and June, and low during September, October, November, and December. Each curve has a high amplitude. The curves for Illinois, Kansas, Maryland, Michigan, Missouri, Ohio, Tennessee, and Wisconsin (Group IV) differ from those of Group III in that their amplitude is less, and that there is a tendency for the curves to be bi-modal with a high period during February and March and another during June and July. Data for these groups are presented in Tables

IV and V. From a study of Graph II it will be seen that the high part of the composite curves for Groups III and IV comes later in the year than is the case for the curve of all 29 states combined.



GRAPH I. PERCENTAGE DISTRIBUTION OF WHOOPING COUGH BY MONTHS FOR A YEAR OF MEDIAN INCIDENCE FOR GROUPS OF COMBINED STATES.



GRAPH II. PERCENTAGE DISTRIBUTION OF WHOOPING COUGH BY MONTHS FOR A YEAR OF MEDIAN INCIDENCE FOR GROUPS OF COMBINED STATES.

### SUMMARY AND DISCUSSION

The results of the analysis of the data for 29 states included in this study, for 1922-1930, may be summarized as follows:

Seasonal incidence of whooping cough is low during the last 4 months of the year, October being the most frequent month of minimum incidence.

Variations are found as regards the month of maximum incidence when groups of combined states are compared. For Groups I and II, seasonal incidence is highest during the first 4 months, the peaks coming in February and March respectively. The curve for Group II has a lower amplitude. For Group III, seasonal incidence is highest during March, April, May, and June, with the peak coming in May. For Group IV, seasonal incidence tends to be bi-modal, being high during February and March and also June and July.

None of these three types of seasonal distribution of whooping cough seems to be associated with any definite geographical area or unit, composed of states having somewhat similar climatic conditions. However, the southern states and those on the Pacific coast have a seasonal curve with a late peak in May (Group III). Furthermore, the northern states with the exception of Minnesota (March and May), Michigan (June and July), and Wisconsin (August) have an early peak for the most part in January or February. If it be true that the peak

of incidence of whooping cough in the south tends to occur in May and in the north in January or February, then the relation of these high points to one another is the reverse of what has been found to be the case for such respiratory infections as diphtheria, measles, and scarlet fever.

NOTE: The author wishes to acknowledge his indebtedness to Mrs. Donald Eveleth for assistance in making arithmetical calculations and in drawing up the tables and graphs.

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## Medical Conditions in Soviet Russia

IN Russia disease is no longer a private and personal matter. Since every inhabitant is a social and economic unit, disease is looked upon as harmful to the State, and restoration of the sick to health, the prevention of disease, and the cultivation of positive health are regarded as State responsibilities. In other words, Soviet Russia is witnessing, for the first time, the efforts of a thorough-going State medicine.

Not that private practice has been entirely abolished in Soviet Russia, for though every physician is required to work 6 hours daily for the State, he may, after that work has been done, treat private patients and be paid for such treatment if any desire him. It has not yet been possible fully to realize the ideal of making competent medical care accessible and free to all in the institutions organized by the State, and it is because of the delay due to insufficient personnel that the doctors still have some private practice. It is believed, however, that private practice is doomed ultimately to be wiped out as the numbers of physicians increase and as State institutions are multiplied.—Lewellys F. Barker, M.D., *The Scientific Monthly*, 35, 1:25 (July), 1932.

## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

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RICHARD A. BOLT, M.D., Dr.P.H., Child Hygiene

EVART G. ROUTZAHN, Education and Publicity

EVA F. MACDOUGALL, R.N., Public Health Nursing

RAYMOND S. PATTERSON, Ph.D., Bibliography

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## BOVINE TUBERCULOSIS AND HUMAN HEALTH

IN 1901 at the London Congress on Tuberculosis, Robert Koch astounded the world by declaring that bovine tuberculosis, if transmissible to human beings at all, was of no more importance than hereditary tuberculosis, and could therefore be practically disregarded. Without any knowledge of the position which Koch had taken, which was contrary to that of Villemin in 1865 and Koch in 1882, work had been carried on for approximately 3 years at the laboratory of the State Livestock Sanitary Board of Pennsylvania, University of Pennsylvania. The conclusions arrived at were entirely contrary to those announced by Koch, and at that time the work lacked only the inoculation of bovine animals to complete the proof according to Koch's own dictum. This was done in the fall of 1901, and on April 24, 1902,<sup>1</sup> the final paper from this laboratory was read before the Pathological Society of Philadelphia, proving beyond all question that the bovine bacillus was pathogenic for mankind and produced disease in children. The same laboratory published several reports of skin infection in veterinarians and others, in which the germ was isolated and proved to be bovine.

Following the Congress in London, the English appointed a Royal Commission, and the Germans an Imperial Commission. The first



Interim report of the English Commission was made May 16, 1904, and the final report in 1911. The German Commission reported also in 1904, and both of them proved conclusively that Koch's statement was incorrect. In 1908 Koch shifted his ground, admitted that the bovine organism did produce disease in human beings, but did not cause pulmonary consumption. While this had academic interest, from the standpoint of disease and death, it was the difference between tweedledum and tweddledee. Except for our federal Bureau of Animal Industry, city and state health officers, and the work of a moderate number of private bacteriologists, the question has remained in abeyance from that time until 1932.

The National Tuberculosis Association,<sup>2</sup> founded in 1904, for the "study and prevention of tuberculosis," decided formally in 1906 to disregard the dangers of bovine disease and to devote its attention solely to the human bacillus and the human case as a distributor of the germ. So we went along with apparently the great majority of people in their ignorance enjoying a state of blissful security which did not in fact exist. A number of people thought that the question had been definitely settled by the eradication of tuberculosis from dairy cattle, and the pasteurization of milk, both of which measures had proceeded at a fair rate of speed, but cattle tuberculosis is still one of the great economic problems of our country, as well as a menace to human health, especially in the case of those under 15 years of age.

Writers have indulged in rejoicing over the decline in tuberculosis, which is unquestionably very gratifying, and have attributed this to antituberculosis measures, disregarding entirely the correlated work of the public health agencies which abound. It seems that the paper by Biraud<sup>3</sup> was the first to raise the question concerning the relative importance in tuberculosis prevention of general public health work and distinct antituberculosis measures, who made the following statement: "A close relationship between both (general and tuberculosis death rates) would tend to indicate the importance of environmental factors and the general state of health on tuberculosis mortality, as compared with direct results achieved by specific antituberculosis measures."

This led to a study<sup>3</sup> by the statistician of the National Tuberculosis Association in which comparisons in some 14 countries are made between the general death rate and that from tuberculosis. In 5 of these, there seems to be evidence that the antituberculosis work is of some value beyond the ordinary public health measures. In the others the curves run almost parallel and seem to demonstrate—what all except those directly engaged in tuberculosis work have believed—

that antituberculosis work is simply one branch of public health work, and does not supersede it or dominate it.

The year 1932 has brought to us two reports which have aroused intense interest and are destined, we believe, to arouse tuberculosis workers from their lethargy. In 1930, Dr. Fremantle,<sup>4</sup> a Member of Parliament, requested the Minister of Health to "issue, for the guidance of the public, a review of the main facts, experience, and conclusions on which action should be based." This was done, but more important was an Extraordinary meeting of the Medical and Science Councils of the People's League of Health at which a committee of sixty, made up of medical, veterinary and agricultural experts, was appointed. Two subcommittees of 23 each were selected from this general committee and have just made their reports,<sup>4</sup> which show that at least 40 per cent of the cows in Great Britain are infected with tuberculosis; that 0.2 per cent suffer from tuberculosis of the udder; that approximately 40 per cent slaughtered in public abattoirs show naked-eye lesions, and that 2 to 13 per cent (average 6.7 per cent) of market milk from various parts of the country contain living tubercle bacilli. The reports further show that 6 per cent of all deaths from tuberculosis are due to the bovine type of bacilli, that 2,000 deaths and at least 4,000 fresh cases due to the bovine infection, mostly in children, occur annually. It is pointed out that a number of cases of tuberculosis, especially of the lymphatic glands, are not reported, so that 4,000 new cases may be regarded as almost certainly an underestimate of the facts.

Following closely on this in America, comes the report of the Committee on Prevention and Research of the International Society for Crippled Children<sup>5</sup> showing that 10-15 per cent of cases of bone and joint tuberculosis are of bovine origin; that of children who suffer from tuberculosis, from 0-5 years, 21 per cent, and 5-16 years, 26 per cent are infected by the bovine germ. The knowledge of these facts has not yet spread through the country. Most of those who have received this knowledge have been, to put it mildly, astonished. Translating these figures into deaths and cases, it means that 3,500-4,000 children annually die in this country from bovine tuberculosis, and that at least 8,000 cases occur; yet the National Tuberculosis Association, which enjoys a rich income from the Christmas Seal sales, amounting one year to approximately 5½ million dollars, and altogether something more than 65 million dollars, has done nothing except pass soothing resolutions concerning tuberculin testing, pasteurization, accredited herds, etc.

The public owes a debt of gratitude to our Bureau of Animal

Industry and to state and city officials in their efforts to suppress bovine tuberculosis, but practically nothing to the National Tuberculosis Association, which indeed congratulates itself in its latest publication<sup>2</sup> on the wisdom of its decision adopted in 1906. The situation passes the understanding of the ordinary individual. The suppression of bovine tuberculosis by the Bureau of Animal Industry is largely a commercial affair, though many veterinarians are deeply interested in the danger of bovine tuberculosis to human beings—more so apparently than the members of the National Tuberculosis Association.

It is high time for a change of sentiment. The facts were positively proved 30 years<sup>1</sup> ago, and it is hard to see that there is any excuse for the negligence which has been evident. The original name of that body did not specify any type of the disease, but tuberculosis in general.

Who can calculate the number of lives saved and the amount of crippling (tuberculosis ranks second as a crippling disease) avoided if we had followed the advice of Abraham Jacobi, great man and great physician, and had been as active in our efforts against bovine infection of children as we have been against the human?

The facts have been before us for 30 years. They have been proved and re-proved. Is there any excuse for longer complaisance or inaction?

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3. Whitney, Jessamine S., and Wilcox, Lloyd. *Tuberculosis Mortality in Fourteen Countries: A Preliminary Study*. National Tuberculosis Assn., 1926. 38 pp.
4. Tuberculosis of Bovine Origin in Great Britain. *Brit. M. J.*, Apr. 2, 1932, 618-19.
5. International Society for Crippled Children. Rochester, N. Y. *Report of Committee on Prevention and Research*. Apr. 18, 1932.

### TEXAS ONLY STATE OUTSIDE DEATH REGISTRATION AREA

FOR the past five years or more the situation relative to the collection of vital statistics in Texas has been under close observation. An enormous amount of work has resulted in the people of the state being fairly aroused to the necessity of proper records of births and deaths. The problems of compensation in connection with the claims of World War veterans have emphasized, as probably nothing else could, the necessity for official records of births and deaths.

Texas has a good registration law, but the state is so large in area and population, that many problems are peculiar to that state

and not found elsewhere. Indexing and filing the enormous number of records is handicapped by insufficient clerical help. A satisfactory organization is restricted by inadequate machinery to function. It is believed that the registration in the state today is fairly complete and probably would meet the 90 per cent requirements of the U. S. Bureau of the Census if the records could be checked. A record that cannot be found is no record.

Texas is a wealthy state and there is no reason why the few thousands of dollars necessary to put the program on an adequate working basis should not be provided. We are confident that funds would be forthcoming if the members of the legislature were made to understand the grave necessity for proper records. The local chambers of commerce, the veterans' organizations, the Parent-Teacher associations, the women's clubs, and the medical societies of the state might well organize to bring sufficient pressure on the legislature to secure this result.

Texas is the only state outside the U. S. Registration Area. Everyone who has to do with public health and the use of these records is looking forward to the day when the term Registration Area may be dropped from our vocabulary and we may refer to the vital records of the United States and not to the records of a restricted area. With the admission of the Lone Star State to the Registration Area, that objective will be accomplished.

Undoubtedly many interesting and intricate problems having to do with the practice of medicine and the practice of public health could be found in this state. Occasionally diseases which are not peculiar to other states are found here, and their extent and menace cannot be adequately understood in the absence of proper records of death.

### PAROLE OF LEPERS

IT is a far cry from the old call, "Unclean, unclean," to the leper of the present day, and it is always a joy to note the progress being made in the control of leprosy as well as its cure.

The most recent report<sup>1</sup> from our National Leper Home at Carville, La., states that 19 patients were paroled during the fiscal year ending June 30, 1931. In the neuropsychiatric service, 17 were examined as candidates for parole, in all of whom the arrest of the disease was quite apparent, and in some there was a complete disappearance of formerly intense neurological disturbances. A special note is struck in this report in telling of the improved morale of lepers and suspects. No longer do the inmates regard themselves as out-

casts from society without hope. While there are always a certain number who abscond, a considerable proportion of these have returned voluntarily for treatment, many even paying their own expenses.

The average daily population of the Home was 322, with a maximum at the end of the year of 337, of whom 63 were new admittances. Of 23 deaths, only 4 were attributed directly to leprosy, nephritis leading with 10, and pneumonia next with 4. Certain departments especially have been enlarged in scope. There is now special treatment of the eye, ear, nose and throat, with the belief that not only can relief for existing disorders be given, but extensions of the disease into these fields may be delayed or prevented. That this enlargement meets a demand is evidenced by the fact that 120,000 treatments were given in this department during the year. A consulting specialist who visits the institution weekly made 10,000 examinations, did refractions, and performed 100 operations. Dermatologic, orthopedic, and dental services are also in operation.

The introduction of additional recreational facilities has produced a marked improvement in the mental attitude of the patients. "The keen competition seems to accelerate both physical and mental functions, broadens views, decreases discontent, and tends to abolish that hand-to-mouth mentality which is so conspicuous in chronic illness."

The decrease in leprosy in practically every part of the world where money and authority are available to carry out what is known scientifically is one of the pleasantest stories that preventive medicine has to tell. The unfortunate leper has suffered from an unreasoning terror on the part of the public. It is a great thing to be able to state that the disease can be arrested and even cured.

## REFERENCE

1. *Pub. Health Rep.*, Mar. 11, 1932.

# ASSOCIATION NEWS

*Sixty-first Annual Meeting of the A.P.H.A.  
Washington, D. C., October 24-27, 1932  
Headquarters, Willard Hotel*

## WASHINGTON LOCAL COMMITTEE SUB-COMMITTEE CHAIRMEN

*General Chairman*—W. C. Fowler, M.D.  
*General Secretary*—L. R. Thompson, M.D.  
*Entertainment Committee*—Dr. J. S. Wall.  
*Finance Committee*—William Gerry Morgan, M.D.  
*Inspection Trips Committee*—Walter S. Frisbie.  
*Registration and Information Committee*—C. N. Nichols.  
*Meeting Rooms Committee*—Brigadier-General M. A. DeLaney.  
*Membership Committee*—J. P. Leake, M.D.  
*Publicity Committee*—William DeKleine, M.D.  
*Ladies' Entertainment Committee*—Gertrude Bowling, R.N.  
*Exhibits Committee*—Ralph C. Williams, M.D.

## ASSOCIATION OF WOMEN IN PUBLIC HEALTH

THE Association of Women In Public Health will meet at an informal dinner at the Willard Hotel, Monday, October 24, 1932, at 6:30. Women of all sections of the American Public Health Association and their guests are invited to renew mutual acquaintanceships and learn of progress in other sections. Tickets will be \$1.50 per plate and should be purchased at the registration desk.

The International Conference of Women at the Century of Progress Exposition will be discussed.

## NOMINATIONS FOR THE GOVERNING COUNCIL

IN accordance with the By-laws of the Association the Nominating Committee reports the following nominations for the Governing Council. The Constitution provides that "upon the petition of twenty-five Fellows, the Nominating Committee shall add the name of any Fellow to this list, providing

such petition is received 15 days before the Annual Meeting."

The ten Fellows receiving the highest number of votes on a written ballot cast by the Fellows present and voting at the Annual Meeting in Washington will be elected for the three-year term, 1932-1935.

Earle G. Brown, M.D.,  
Secretary, State Board of Health,  
Topeka, Kansas.

Herman N. Bundesen, M.D.,  
City Health Officer,  
Chicago, Illinois.

J. W. M. Bunker, Ph.D.,  
Massachusetts Institute of Technology,  
Cambridge, Massachusetts.

M. M. Davis, Ph.D.,  
Director for Medical Service,  
Julius Rosenwald Fund,  
Chicago, Illinois.

W. Thurber Fales, M.D.,  
Director, Bureau of Vital Statistics,  
Montgomery, Alabama.

Wade H. Frost, M.D.,  
Johns Hopkins University,  
Baltimore, Maryland.

- George W. Fuller,  
Fuller and McClintock,  
New York, New York.
- J. C. Geiger, M.D.,  
Health Officer,  
San Francisco, California.
- Willard P. Greene, M.D.,  
Div. of Preventable Diseases,  
Minnesota State Board of Health,  
Minneapolis, Minnesota.
- Alice Hamilton, M.D.,  
Harvard University,  
Cambridge, Massachusetts.
- Norman MacL. Harris, M.B.,  
Chief, Laboratory of Hygiene,  
Ottawa, Canada.
- Ira V. Hiscock, Ph.D.,  
Yale University,  
New Haven, Connecticut.
- Sally Lucas Jean,  
Health Consultant,  
New York, New York.
- W. F. King, M.D.,  
State Health Officer,  
Indianapolis, Indiana.
- E. S. MacPhail,  
Superintendent, Bureau of Statistics,  
Ottawa, Canada.
- Bleecker Marquette,  
Ex. Sec., Public Health Federation,  
Cincinnati, Ohio.
- John E. Monger, M.D.,  
U. S. Standard Products Co.,  
Columbus, Ohio.
- W. H. Peters, M.D.,  
Health Commissioner,  
Cincinnati, Ohio.
- J. L. Pomeroy, M.D.,  
Health Officer, Los Angeles County,  
Los Angeles, California.
- Samuel C. Prescott,  
Massachusetts Institute of Technology,  
Cambridge, Massachusetts.
- R. R. Sayers, M.D.,  
U. S. Bureau of Mines,  
Washington, D. C.
- Wilson G. Smillie, M.D.,  
Harvard School of Public Health,  
Cambridge, Massachusetts.
- William F. Snow, M.D.,  
Gen. Dir., American Social Hygiene Association,  
New York, New York.
- Clair E. Turner,  
Massachusetts Institute of Technology,  
Cambridge, Massachusetts.
- George H. Van Buren,  
Metropolitan Life Insurance Co.,  
New York, New York.
- Elsbeth Vaughan, R.N.,  
St. Louis, Missouri.
- Augustus B. Wadsworth, M.D.,  
Laboratory, State Department of Health,  
Albany, New York.
- Watson F. Walker, D.P.H.,  
Commonwealth Fund,  
New York, New York.
- Estella F. Warner, M.D.,  
U. S. P. H. S.,  
Washington, D. C.
- Abel Wolman,  
Chief Sanitary Engineer,  
Department of Health,  
Baltimore, Maryland.
- A. J. CHESLEY, M.D.,  
*Chairman,  
Nominating Committee.*

## APPLICANTS FOR FELLOWSHIP

- HEALTH OFFICERS' SECTION—James N. Baker, M.D., Montgomery, Ala., Joseph Blickensderfer, M.D., New Philadelphia, O., Walter J. Connell, M.D., Dubuque, Ia., William L. Hart, M.D., Omaha, Neb., John L. Lavan, M.D., Toledo, O., Charles B. Maits, M.D., Pittsburgh, Pa., Arthur W. Newitt, M.D., Midland, Mich., Giles S. Porter, M.D., San Francisco, Calif., Lester A. Round, Ph.D., Providence, R. I., James R. Smith, M.D., Erie, Pa., Samuel J. Stewart, M.D., Alhambra, Calif., Jerry E. Vanderpool, M.D., Walla Walla, Wash.
- LABORATORY SECTION—James H. Black, M.D., Dallas, Tex.
- VITAL STATISTICS SECTION—Jerome Meyers, M.D., New York, N. Y.
- PUBLIC HEALTH ENGINEERING SECTION—Lee M. Clarkson, Atlanta, Ga., Henry Duke Peters, B.S. in C.E., Jacksonville, Fla., Louis F. Warrick, B.S. in C.E., Madison, Wis.
- INDUSTRIAL HYGIENE SECTION—Frederick B. Flinn, Ph.D., New York, N. Y., Albert S. Gray, M.D., Hartford, Conn., Adelaide R. Smith, M.D., New York, N. Y.

**FOOD AND NUTRITION SECTION**—Hugh N. Heffernan, B.S., New Orleans, La., Lawrence H. James, Ph.D., Washington, D. C., George C. Supplee, Ph.D., Bainbridge, N. Y.

**CHILD HYGIENE SECTION**—John E. Burke, M.D., Schenectady, N. Y., Helen A. Cary, M.D., Portland, Ore., Isidore H. Goldberger, M.D., New York, N. Y., Louise Strachan, A.B., New York, N. Y.

**PUBLIC HEALTH EDUCATION SECTION**—Maurice A. Bigelow, Ph.D., New York, N. Y., Palmer R. Bowdish, M.D., Provo, Utah, Bertrand Brown, A.M., New York, N. Y., Edward F. Brown, New York, N. Y., Kendall Emerson, M.D., New York, N. Y.,

Florence L. Meredith, M.D., Boston, Mass., George J. Nelbach, LL.B., New York, N. Y., Edith P. Sappington, M.D., San Francisco, Calif.

**PUBLIC HEALTH NURSING SECTION**—K. Frances Cleave, B.S., Harrisburg, Pa., Edith Granger, R.N., Orange, N. J., I. Malinde Havey, R.N., Washington, D. C.

**EPIDEMIOLOGY SECTION**—Milford E. Barnes, M.D., Iowa City, Ia., Howard A. Lanpher, M.D., Des Moines, Ia., Joseph Smith, M.D., Providence, R. I.

**UNAFFILIATED**—Luther M. Boyers, M.D., Berkeley, Calif., Solomon L. Skvirsky, M.D., Holyoke, Mass.

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated and action by the Section Council will follow.*

### *Health Officers Section*

Levi A. Barnett, M.D., Dept. of Health, Greenwood, Miss., Director, County Health work  
F. G. Bartel, M.D., County Health Dept., Newton, Kans., County Health Officer

Primitivo V. L. Cohen, D.D.S., Calle "27 de Febrero" No. 74 (Altos) Santo Domingo, West Indies, Sanitary Health Officer

H. O. Collings, M.D., Health Dept., Quincy, Ill., Public Health Officer

George Holden Coombs, M.D., State Dept. of Health, Augusta, Me., Director of Health

E. S. Gillespie, M.D., Health Dept., Peoria, Ill., Commissioner of Health

A. Judson Kemper, M.D., Court and Washington, Clarksburg, W. Va., County Health Officer

William P. Prescott, Health Dept., Claremont, N. H., Health Officer

Ralph W. Sanders, M.D., Health Dept., Alameda, Calif., Health Officer

### *Laboratory Section*

Emil Bogen, M.D., Olive View, Calif., Director of Laboratories

Cassius L. Clay, State Board of Health, New Orleans, La., State Analyst, Charge of Bureau of Food, Drugs and Chemical Laboratory

Roscoe R. Spencer, M.D., National Institute of Health, Washington, D. C., Medical Research Worker

### *Public Health Engineering Section*

John B. Harrington, 24 Washington St., S. Charleston, W. Va., Assistant Sanitary Engineer, State Health Dept.

Joseph G. Hildebrand, 35 E. Wecker Drive, Chicago, Ill., Secretary-Manager, Plumbing and Heating Industries Bureau

### *Food and Nutrition Section*

S. H. Loeb, 452 Humboldt St., Denver, Colo., Food, Drug and Sanitary Commissioner

Robert P. Straka, 216 13th S. W., Washington, D. C., Assistant Bacteriologist, Bureau of Chemistry and Soils, U. S. Dept. of Agriculture

T. Lowell Swenson, 216 13th S. W., Washington, D. C., Associate Bacteriologist, Food Research Division, U. S. Dept. of Agriculture

### *Child Hygiene Section*

Barnett H. Cooper, M.D., 122 W. Main St., Glen Lyon, Pa., Medical Inspector of Schools

Eleanore Cushing-Lippitt, M.D., 325 E. Wisconsin Ave., Milwaukee, Wis., Vocational School Physician, Dept. of Health

Eugene C. Peck, M.D., 138 Huntington St., New London, Conn., Epidemiologist, State Dept. of Health

Dr. H. L. Woodside, Bigler, Pa., School Medical Examiner

### *Public Health Education Section*

Harold M. Frost, M.D., 95 Milk St., Boston, Mass., Medical Director, New England Mutual Life Insurance Company

Catharine P. Hanly, 320 Martin Brown Bldg., Louisville, Ky., Director of Health Education, Central Dairy Council

Eric M. Matsner, M.D., 1016 Fifth Ave., New York, N. Y., Assistant Visiting Gynecologist, City Hospital



Charles W. Robinson, M.D., City and County Health Dept., Atchison, Kans., City Health Officer

*Public Health Nursing Section*

Ethel M. Barton, Sullivan County Health Dept., Blountville, Tenn., Staff Nurse

Helen E. Bond, R.N., 210 E. Gaston St., Savannah, Ga., Director, Savannah Health Center

Ruth Burrow, R.N., State Health Dept., Nashville, Tenn., Public Health Nurse

Maude E. Hatheway, R.N., 75 Trinity Ave., Lowville, N. Y., School Nurse

Mrs. R. E. McClung, R.N., 809 Pine St., Trinidad, Colo., Red Cross Board Member  
Margaret A. Paul, R.N., 43 S. Lansdowne Ave., Lansdowne, Pa., Director, Visiting Nurse Assn.

Ora E. Phillips, R.N., Rutherford County Health Dept., Murfreesboro, Tenn., Public Health Nurse

*Unaffiliated*

Miguel Cespedes Alvarez, M.D., Steinhart—Avenue Columbia, Marianao, Cuba, Secretary of Sanitation for Cuba

## LETTER FROM GREAT BRITAIN

### A PLETHORA OF CONVENTIONS?

ALTHOUGH almost annually somebody or other raises a cry that there are far too many congresses, conventions, and conferences, and in the interests of economy something should be done to reduce the number, nothing ever happens. This year, indeed, when it might be believed that the need for economy was particularly obvious, there appear to be just as many, if not more, than usual. Not only so, but the number of delegates appointed, if smaller at all than the average, is very little below.

The congress of the Royal Sanitary Institute which generally attracts from 1,200 to 1,500 persons, will this year register probably at least the lower figure, the number of appointed delegates to date (a month before the meeting) being in the neighborhood of 800. Having regard to the fact that invitations to appoint representatives were only issued about 4 months ago, and much later than usual, this is regarded as a most gratifying response, and as assuring complete success for the meeting.

As usual, the congress will meet in a number of sections and conferences where a variety of subjects of interest and importance will be discussed under the presidency of persons of prominence

and distinction. It is a source of great gratification generally, and particularly to those who are privileged to know him, that Professor Winslow of Yale is to deliver what is known as the "lecture to the congress," and has chosen as his subject, "Current Tendencies in American Public Health."

### CHILD WELFARE, TUBERCULOSIS, AND LOCAL GOVERNMENT

ROUND about the time of the holding of the congress of the Royal Sanitary Institute at Brighton—a seaside and health resort about an hour's journey by rail from London—there will have been or will be held certain other conferences. The most important of these are those on maternity and child welfare, and tuberculosis. Each is to be held in London under the presidency of the Minister of Health (Sir E. Hilton Young), though it is probable that the active part he will take will be limited to the delivery of an address offering encouragement and indicating the need for having regard to the difficulties of the moment.

A congress already held is that bearing the resounding title of International Congress of Local Authorities, 1932. This, though not largely attended, included representatives of most nations.

The subjects chosen for discussion were not too interesting: "The practical working of local authorities," and "Recruitment and training of local government officials." The fact that each speaker appeared to believe, erroneously, that the way in which he could assist in securing uniformity was by describing at length the system in operation in his own country, in the language which only he and his own nationals understood, while others had to wait for a translation before learning what it was all about, did not add to the interest or the gaiety of the proceedings.

#### CITY MANAGERS

INCIDENTALLY, certain delegates from the United States endeavored to frighten the English official representatives to death by pronouncing strongly in favor of the city manager system. With the exception of a few cranks and individuals with views upon, but without experience and knowledge of, local government methods in this country, the generality of persons engaged upon it dislike the manager idea intensely.

To allow of the appointment of such an officer, indeed, would involve a complete alteration of the local government system, if not of the entire mentality of the people. Largely it is because the mentality and the outlook of the peoples differ so very markedly, and were shown at this meeting to be as different as their speech and their mode of thought, that the impression was obtained that as a conference it failed to secure any practical result and must always fail.

Doubtless as an outcome of the gathering there may have come an increase in friendliness and in understanding, and the social functions—some of which, arranged by the Government, the Lord Mayor of London, and others, were of an extreme brilliance—must have created and encouraged such feelings. From the practical local government point of view and that of persons

who have to work the machine, it is open to doubt if it had any value at all, or if any international congress dealing with matters of really domestic concern ever can have value.

#### STERILIZATION OF THE MENTALLY UNFIT

SINCE the National Government came into power a certain amount of pressure has been brought to bear upon the Minister of Health to make some pronouncement on the subject of sterilization of the unfit. Under this pressure, and perhaps on account of the fact that it was brought home to him that in certain parts of the United States something was being done in regard to this problem, the Minister eventually gave a promise that he would set up a committee to inquire into and advise him upon the subject.

This promise has now been kept, and announcement made of the personnel of the committee and the terms of reference. These last are: "To examine and report on the information already available regarding the hereditary transmission and other causes of mental disorders and deficiencies; to consider the value of sterilization as a preventive measure, having regard to its physical, psychological and social effects, and the experience of legislation in other countries permitting it; and to suggest what further inquiries might usefully be undertaken in this connection."

Among members of the committee mention may be made of L. G. Brock (the chairman), who is chairman of the Board of Control, and as such has a wide knowledge of psychiatry; Dr. Wilfred Trotter, an honorary surgeon to the King, who has done a great deal of work on the surgery of the brain; Dr. Tredgold, a specialist of note in psychological medicine, whose textbook, *Mental Deficiency*, is now in its fifth editions; and Drs. E. W. Adams and R. H. Crowley, the former a medical

officer of the Ministry of Health, and the latter of the Board of Education. Dr. Crowley, who spent some time in the United States some years ago visiting various child guidance clinics, is probably known to many concerned in this movement and in the prevention and treatment of mental defect. That the labors of the committee may be prolonged, and that it may be some time before they find themselves in a position to report, is fairly generally recognized as possible.

#### HONORS FOR THE HEALTH SERVICE

AT the new year and on the occasion of his birthday, H. M. The King makes a point of conferring upon such of his subjects as have earned it, or appear or are recommended to him as being deserving of it, certain honors which are in his gift and his alone. This may take the form of a title, or an order, or a medal, and one of the better known British pastimes is to examine with care the "New Year's List," and the "Birthday List," when they appear in the press, to discover if perchance an honor has fallen to a friend or a colleague.

By public health officers particularly, close search is made on every occasion, and only very rarely does it happen that the work done by those engaged in the health service of the people goes unrecognized. The last list, a "Birthday List," which was comparatively short, no doubt because of a feeling that there were other and more serious matters to be attended to, contained an honor for the public health service in the form of a "knighthood" conferred upon Lieut.-Colonel F. E. Fremantle, a member of parliament, a former president of the Society of Medical Officers of Health, and a member of the Council of that Society and of the Royal Sanitary Institute. Sir Francis Fremantle, before his election to parliament, was for a number of years a county medical officer of health. An idealist and an enthusiast in public health and preventive medicine, Fremantle is a tremendously hard worker in parliament and out of it. He is greatly liked and admired by all medical officers of health, who are very proud of the success he has achieved, and especially of this honor which everyone agrees he has thoroughly well earned.

CHARLES PORTER, M.D.

*London*

# PUBLIC HEALTH ADMINISTRATION

## DIPHTHERIA IMMUNIZATION EXHIBIT, HAMILTON, ONTARIO

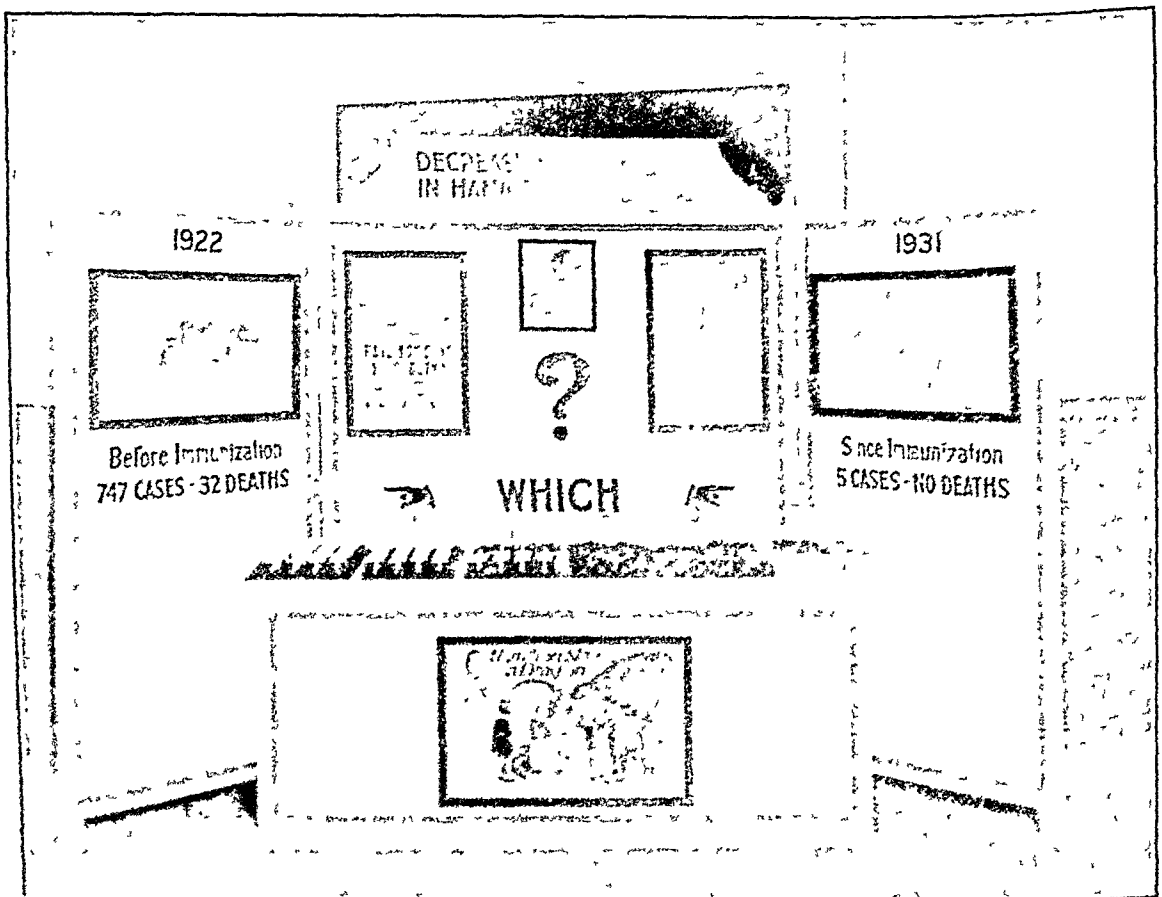
JAMES ROBERTS, M.D., F.A.P.H.A.  
*Medical Officer of Health, Hamilton, Ontario*

IN spite of the success of our diphtheria immunization work since 1922 it was found essential to awaken, or I might say re-awaken interest in the subject, so that the almost absence of diphtheria in the city would not lull parents into such a sense of security that they would neglect to have their children immunized; and to depict to them in a manner that would leave no doubt in their minds that the work had

resulted in a great decrease in cases and deaths.

To do this something had to be evolved that could be easily transported from place to place, that would fit into store windows and similar positions where accommodation was limited, and, above all, that would immediately arrest attention so that the passer-by would stop to look.

The background is made up of three



separate screens manufactured of 1" pine, the panels being of three ply wood. These three sections fit together with brass hinges by means of removable pins. On the left is shown a map of the city in which are placed 747 dark green pins to denote the number of cases, and 32 orange colored pins to show the number of deaths. Over this map "1922" is written. Underneath are the words "Before Immunization"—"747 Cases—32 Deaths." On the center panel are shown three framed posters that have been used in Hamilton at various times to draw attention to diphtheria immunization. Under the small center poster is a large interrogation mark and the word "Which" with a hand pointing to either side. The right hand panel again bears a map of the city showing only 5 green pins, head "1931," and underneath the words—"Since Immunization"—"5 Cases—No Deaths."

In front of this three panel screen is a table with removable legs, surrounded with a panelled screen.

On this table are set up a number of small white crosses, each fitted into a small hole in the table top, which is in turn covered with artificial grass. Each section denoting a particular year is divided by an imitation gravel path. A larger cross with the year written upon it calls attention to the number of deaths in that particular year. Thus, 1920 has 44 crosses; 1922 has 32; 1925 has 14; 1929 has 1, and 1930 has 2.

The end section depicting 1931, in which year we had no deaths, is shown as a vacant field surrounded with a picket fence and adorned with a notice board on which appears "1932"—"Vacant."

On the front of the panel is shown a three colored poster entitled "Hamilton

Slays a Dragon." This depicts a line-up of youngsters receiving toxoid treatments while a nurse, in movie parlance, registers joy. In the background is a fearsome looking dragon sneaking away up over the mountain that borders the southern flank of the city.

The whole exhibit is finished in white enamel with light green trim, with all lettering and picture frames in jet black. This color scheme is very effective, especially under artificial light.

To arrest attention further, wax figures of a nurse in uniform and a small girl were posed in front and on either flank of the exhibit, with a small card held in the girl's hand with the caption "Protect Me Too."

The cost was very moderate, and with the greatest good-will and coöperation on the part of store-keepers and others we have effectively demonstrated to the citizens of Hamilton the fact that toxoid has practically banished diphtheria from their midst.

#### NUMBER OF IMMUNIZATIONS

Year	School Children		Preschool Children		Total
1922-23		1,005		486	1,491
1923-24		3,859		843	4,702
1924-25		2,055		428	2,483
1925-26		2,703		1,302	4,005
1926-27		2,738		1,466	4,204
1927-28		2,931		2,115	5,046
1928-29		1,852		1,788	3,640
1929-30		1,976		2,571	4,547
1930-31		2,011		2,609	4,620
1931-32 (November to March Inclusive)		1,203		1,235	2,443
Totals		<u>22,338</u>		<u>14,843</u>	<u>37,181</u>

NOTE: We are at present engaged in determining the actual percentage of the school population that is immunized, and, while this work is incomplete we anticipate having a figure anywhere between 75 and 85 per cent.

## REVIEWS OF ANNUAL REPORTS

Newport, R. I.—An amendment to the milk regulations provided in 1931 for Grade A pasteurized milk. To qualify for this grade, milk must come from herds tuberculin tested, be effectively refrigerated, have a high butter fat content, be produced under sanitary conditions, and the employees must have medical examinations. There are 6 local pasteurization plants for this city of 25,607. Periodic examinations are made of the ice cream supply in addition to the extensive supervision of milk production and handling.

Cases of communicable disease are cared for at the Newport hospital at a rate of \$3.50 per day. During the year, 704 days of treatment were recorded. Thirty-one new cases of pulmonary tuberculosis were reported with 12 deaths. An infant mortality rate of 42.7 is noted.

Manchester, N. H.—An extensive tuberculosis program is reported for this city of 76,834 population, which includes a clinic and nursing program jointly maintained by the city and the New Hampshire Tuberculosis Association.

The attendance at the clinics has been the largest in any year since the program was inaugurated in 1916. Several reasons may be assigned for this record attendance. First, the active work of the nurses in case finding—particularly in the matter of clinic examinations of all contacts in the families of tuberculosis patients; second, the ever growing interest and participation of the public in the program; third, the difficult economic conditions which are causing increased physical breakdowns of many people.

The admissions to sanatoriums have increased, and a slight increase in active cases is noted, although the mortality rate has continued to decline.

Brookline, Mass.—This community of 48,700 records a general mortality rate of 10.5 and an infant mortality rate

of 29.3. There were 9 cases of diphtheria, with the first death reported from this disease in 8 years. There are records of 8,275 children who have been given diphtheria immunization treatment. About 81 per cent of the births to residents occurred in hospitals outside of the town. There were 12 deaths of residents from tuberculosis, giving a rate of 24.6. This community received the 1931 award in its population class from the U. S. Chamber of Commerce Health Conservation Contest.

Trenton, N. J.—In 1931 an ordinance was adopted forbidding the sale of any milk or cream in the city except pasteurized or certified. A second ordinance provided for the appointment by the Board of Health of a psychiatric nurse. A mental guidance clinic, established in 1930, is in charge of a psychiatrist, assisted by a psychologist, from the New Jersey State Hospital. The new nurse devotes her time to cases in their homes, especially school children, to histories of patients and families, and to assistance in securing medical and other examinations of cases in clinics.

The work done thus far has been of inestimable value to the community. The individual examinations have been painstaking in the extreme and the recommendations as to future care and treatment of patients have been faithfully carried out, with the result that many families have been relieved of what had become almost heartbreaking burdens and we are sure they feel deeply grateful to the municipality for the service.

San Diego, Calif.—A new significance was given Mother's Day in 1931 according to the annual report of the Health Department. In cooperation with the Maternity Center Association of New York, this city took its place in the national campaign to direct public attention to the high mortality rate from causes associated with pregnancy

and child birth. The program included national and local broadcasts, supplemented by news releases on the health of the expectant mother. Letters to all members of the County Medical Society outlined the program and presented local statistical data regarding causes of maternal deaths. Letters urging local clergymen to discourse on "The Newer Meaning of Mother's Day" were received with understanding interest. Many sermons urged upon the public the need to appreciate the importance of proper prenatal supervision. Public health nursing visits were made in an effort to extend prenatal health supervision among the needy.

Floyd County, Ga.—This whole-time health unit considers as its major activity the dissemination of information to the citizens of the county on matters pertaining to modern public health work. The newspaper published at the county seat published 40 articles on the work of the Health Department, and otherwise aided in publicity matters. In the treatment of dietary diseases, such as pellagra, the unit provided 475 pounds of yeast for county patients. Sixty-one persons received antirabic treatment during the year. Child hygiene work included an emphasis on school health supervision. A total of 3,325 complete typhoid prevention treatments were given, besides 645 children immunized against diphtheria, and 1,215 vaccinated against smallpox. This annual report concludes with an interesting financial statement showing that at moderate rates, the prevention work done in terms of immunizations, health examinations, etc., may be considered as assets amounting to \$44,695

for the year, against costs of \$7,644 for the department.

Greenville, S. C.—Among the accomplishments of 1931 were the creation of the office of full-time dairy supervisor for the 70 dairies supplying milk to the city, improvements in the milk supply, strengthened nursing service, medical examination of all food and milk handlers with vaccination against typhoid and smallpox, and increased public health instruction. An infant mortality rate of 48.3 is contrasted with 79.6 for the previous year. There were no cases nor deaths from typhoid, and only 1 death from diphtheria was recorded.—*An. Rep.*, Board of Health, Greenville, S. C., 1931.

Pittsfield, Mass.—In 1931, this city of 50,374 population recorded a resident mortality rate of 9.5 and an infant mortality rate of 50.9. There were only 3 cases of diphtheria, 2 of which were carriers, reported, with no deaths. Two school immunization clinics and a campaign to protect younger children from diphtheria were conducted.

Tuberculosis activities increased during the year by treatment in Westfield of many of the children found by the Chadwick clinic service to have hitherto tuberculosis. By the end of the year, however, these children began to return home, most of them vastly improved in health. From the establishment of anti-tuberculosis work in 1919, until 4 years ago, there was a marked decline in the tuberculosis morbidity and mortality. Since then, the decline has been more gradual. On the *Appraisal Form for City Health Work*, the health officer records a rating of 782.

## VITAL STATISTICS

Vital Statistics for Indiana, 1931—The Vital Statistics Division of the Indiana State Board of Health has made a tentative report for the calendar year 1931. While the number of deaths from certain causes may be changed slightly as delayed reports are received, the rates will not be changed and are substantially correct.

It is interesting to note that the total death rate for the State of Indiana, 11.9 per 1,000 population, is the lowest general death rate ever recorded in the state. The death rates from tuberculosis (61.1), typhoid fever (2.9), infant diarrhea (13.9), puerperal septicemia (2.6), and from all puerperal causes (9.6) are the lowest ever recorded in the state in any year. The death rate from diphtheria (4.1) is the same as that for 1930. There was a noticeable increase in the death rate from cancer, from 104.6 in 1930 to 106.1 in 1931, and from the total external causes from 108.7 to 112.7. Under this classification, homicides showed a slight decrease with the 1931 rate standing at 6.4 per 100,000 population, while suicide and accidental deaths showed increases. The increase in suicide was from 20.0 to 20.6 while that for accidental causes was from 82.0 in 1930 to 85.7 in 1931. One of the most gratifying returns was a substantial reduction in the death rate from organic heart disease from 190.0 in 1930 to 176.8 in 1931.

The 1931 infant mortality rate of 57.4 is the same as it was in 1930, since the slight reduction in the number of infant deaths, from 3,404 in 1930 to 3,214 in 1931 was balanced by a proportionate decrease in births from 59,250 in 1930 to 55,950 in 1931. The puerperal mortality was higher in 1931

than in 1930, 5.6 and 5.5 (per 1,000 live births) for the 2 years respectively. —Indiana State Board of Health, *Month. Bull.*, 35:2-3 (Jan.), 1932.

Smallpox in the United States and Canada, 1931—Reports from 43 states, the District of Columbia, and 8 Canadian provinces indicate a decided decrease in the prevalence of smallpox in these areas during the year 1931. The case fatality rate, however, showed no appreciable reduction.

The total number of cases in the United States and Canada, declined from 44,977, in 1930, to 26,869, in 1931. In the United States alone, the drop was from 43,694 cases to 26,004, and in Canada, from 1,283 to 865. The case fatality rate, however, was not appreciably reduced except in the urban centers of the United States, where the rate recorded for a group of 626 cities was only 0.17 per 100 cases, as compared with 0.21 in 1930. In 85 Canadian cities, there have been no deaths from smallpox during the past 2 years, and only 1 fatal case was reported in 1929.

Of the 26,004 cases of smallpox reported in 43 states last year, at least 86 per cent or 22,413 cases, occurred in but 19 states, lying chiefly in the north central and western sections of the country. Two states—Kansas and South Dakota—reported more than 1 case per 1,000 of population, and 3 others—Indiana, Iowa and Vermont—just barely missed that ratio. Indiana, alone, recorded more than 3,000 cases; Iowa and Kansas, well over 2,000 each, and Illinois, Ohio, Oklahoma and Texas, very close to that number.

The states just mentioned are, by and



large, those in which there is not general acceptance of the value of vaccination and revaccination as preventive measures against smallpox. To appreciate fully the significance of the figures cited above, it is necessary merely to compare them with those of a group of 15 states in which vaccination is the general practice, namely, the states along the Atlantic Seaboard. The population of these 15 states is approximately that of the first group of 19, that is 48,900,000 against 48,711,000. And yet there were only 1,063 smallpox cases reported in these Atlantic Coast States as against 22,413 in the central and western group. The case incidence rate in these Eastern Seaboard States is only 2 per 100,000, as against 46 per 100,000 in the central and western group. Comparing the 3 Pacific Coast States with those on the Atlantic Seaboard, it is found that there were reported more than 3 times as many cases of smallpox (3,421) in the former area as in the latter (1,063), although the population of the Pacific States is only one-sixth that of the Atlantic States. In fact, there were more smallpox cases (1,112) in the single State of Washington, with a population of but 1,589,000, than occurred among the 48,900,000 inhabitants of the whole Atlantic Coast.

These findings reflect the fuller appreciation and more general acceptance of vaccination as a preventive against smallpox among the population of the Eastern Seaboard. If, for example, the same conditions had existed in the Atlantic Coast area as prevailed to cause the high case rate of 133 per 100,000 in Kansas, there would have occurred over 65,000 cases of smallpox in these states instead of the 1,063 cases actually recorded.

It is hard to realize that in this day, with the knowledge of the ease with which smallpox can be controlled, there are communities like Helena, Ark.; Fort Scott, Kas., and Bennington, Vt., where

1 out of every 100 of the population has been infected with smallpox during a single year. What this means can best be understood by supposing the same case rate that was reported for Fort Scott, Kas., to have prevailed in the City of New York. In that case, there would have occurred in 1931 at least 85,000 cases of smallpox in New York. Actually only 1 case was reported in the Metropolis during that year.—Met. Life Ins. Co. *Stat. Bull.*, 13:4-8 (May), 1932.

**Vital Statistics for Italy**—Preliminary returns of vital statistics for Italy in 1930 show an increased birth rate and a decreased death rate over the figures for 1929. The birth rate for 1930 was 26.2 per 1,000 population as compared with 25.1 in 1929, 26.2 in 1928, 27.8 in 1925. The death rate from all causes in 1930 was 13.77 per 1,000 population as against 16.14 in 1929 when the mortality exceeded the rates for 1928 (15.76) and 1927 (15.77). The high mortality in 1929 is striking enough to warrant further examination, for it is entirely out of harmony with the gradually decreasing death rate which the greater interest in and attention to public health are effecting in Italy as well as in a great many other countries.

Analysis of the causes of death in 1929 shows that deaths from diseases of the respiratory system were strikingly higher than during the previous year. Influenza, bronchitis (acute and chronic), pleurisy, pneumonia (all forms), and the other diseases of the respiratory system (exclusive of tuberculosis) took a toll of 154,093 lives in 1929 as compared with 124,914 in 1928. This increase in deaths from diseases of the respiratory system of 29,179 is more than large enough to compensate the difference (21,569) in the total number of deaths in 1929 and 1928. Influenza increased from a rate of 24.8 per 100,-

000 in 1928 to 47.3 in 1929; bronchial pneumonia from 143.7 to 169.5; chronic bronchitis from 26.2 to 33.5; and all other diseases of the respiratory system (exclusive of tuberculosis) from approximately 110.2 to approximately 122.5. It is of particular interest to note that despite the increase in deaths from this group of causes, there was a decrease in pulmonary tuberculosis from 92.3 in 1928 to 89.9 in 1929, and from all other forms of tuberculosis, from 33.1 to 31.5. Usually when diseases of the respiratory system are causing high death rates, tuberculosis rates also are high.

Among the diseases which declined in 1929 over 1928, diarrhea and enteritis (under 2 years of age) showed a drop from 165.0 in 1928 to 148.1 in 1929; and suicide declined from 9.5 to 8.8. The 1927 suicide death rate had been 10.4.—Statistical Tables from *Annuario Statistico Italiano Anno.*, IX:31 and 61, 1931.

**The Achievements of a Century in Belgium**—In commemoration of the one hundredth anniversary of the independence of Belgium, *The Scalpel*, one of the oldest medical journals in existence, has published a special number, in which the most eminent medical authorities of Belgium have summed up the accomplishments of the last century. The authors showed that, while the development of public hygiene in Belgium may appear to have been slow up to the end of the 19th century and to have been confined to the more or less efficient application of administrative or technologic measures, the era of Pasteur opened up paths in which there is evidence of an activity that has brought forth most satisfactory results. The etiology of the various transmissible diseases once established, an adequate crusade was launched against each disease, and excellent results have usually followed.

Such pestilential diseases as cholera, the plague, exanthematic typhus, and smallpox (which in 1870 caused 4,163 deaths in a population of 5,000,000) have completely disappeared from the list of causes of death in Belgium. The country rarely encounters a case of malaria, unless it is one which has been imported from one of the neighboring countries where the disease is still an important health problem. Typhoid fever which formerly made serious inroads on the population and which, as late as 1870 to 1880, caused 4,000 deaths annually, has been reduced to 224 cases in 1927. Diphtheria, which caused more than 4,000 deaths every year up to 1890, and 1,828 in 1900, was responsible for only 254 deaths in 1927. Deaths from scarlet fever dropped from 3,364 in 1870 (5,000,000 population) to 118 in 1927 (8,000,000 population); deaths from measles from 3,320 to 679, and deaths from whooping cough from 3,472 to 863. The mortality from pulmonary tuberculosis, tuberculosis of the bones and of the cerebral meninges, for which a death rate of 350 per 100,000 prevailed in 1870, has been reduced to a rate of less than 90 deaths per 100,000 population in 1927, its death rate having been reduced by three-fourths. Infant mortality, which in 1876 ranged around 167 per 1,000 live births, dropped to 107 in 1922 and to 92 in 1927.

In conclusion it may be stated that, owing to the improvement of the economic, social and particularly the hygienic conditions of Belgium, the number of deaths from all causes in 1927 totalled almost exactly the number reported in 1830 when the population was just about one-half its present number.

The general mortality rate in 1830 was 25.57 per 1,000 population, 23.26 in 1870; 20.85 in 1890; 15.20 in 1910; 13.84 in 1920 and 13.46 in 1927.—*J.A.M.A.*, 98:1490 (Apr. 23), 1932.

**Typhoid Fever in the Large Cities of the United States in 1931**—This report of the typhoid fever mortality in 93 United States cities of more than 100,000 inhabitants, is assembled from reports of deaths from the respective health departments of the cities, and the 1931 rates are based on the population of July 1, 1931, as estimated by the United States Bureau of the Census, except in a few instances in which such estimates were not made; in these cases, the population figures of the year 1930 federal census were employed. No adjustment has been made for resident and nonresident deaths, since such an adjustment would be difficult and would not necessarily result in a statement of true mortality.

Five of the 14 New England cities (Cambridge, Fall River, Lynn, Somerville, Waterbury) had no deaths from typhoid fever during 1931. Boston apparently equals its good record of 1930 with a rate of less than 1 per 100,000. Lowell, which has not had an enviable typhoid picture in recent years, reports a much lower figure for 1931. Springfield, which was the banner city for the period 1926-1930, when the rate was 0.4, did not do as well in 1931, the rate being 2.6 this year, and Hartford shows an average typhoid rate for 1930 and 1931 considerably higher than the average for the preceding 10 years.

The typhoid death rate 1.07 for the New England group as a whole is, with one exception (1928), the lowest ever recorded. These cities have improved their condition relatively with respect to the Middle Atlantic group, the rates this year being almost identical in the two sections.

The cities in the Middle Atlantic states, by far the most populous of the 8 geographic groups, had an average rate in 1931 almost exactly like that in 1930 (1.06 and 1.03 for the 2 years respectively). Reading and Utica had no typhoid deaths in 1931, the latter re-

peating its perfect record for the second successive year. Paterson on the other hand, which had no typhoid deaths in 1930, records a rate of 2.9 in 1931. Newark, Jersey City, Syracuse, Philadelphia, and Camden had the same rates for 1931 as for 1930, and Erie, New York, and Elizabeth had rates substantially the same for the 2 years. Buffalo shows an encouraging decrease from 3.9 to 0.7. Camden and Elizabeth, with rates of 4.2 and 4.3 for the two cities respectively, again bring up the bottom of the list as they did in 1930. The increase in New York (0.9 to 1.1) small, to be sure, but worth noting, seems to be chiefly due to three outbreaks during the second quarter of 1931 caused by unregistered carriers. The skill and thoroughness with which these outbreaks were traced to food handlers are worthy of emulation. More than half of the typhoid cases occurring in New York City, in which the probable mode of infection could be traced, were apparently contracted outside the city.

Five of the 9 cities in the South Atlantic group (Jacksonville 3.0, Tampa 3.8, Washington 3.9, Norfolk 5.4 and Atlanta 12.6) had higher rates in 1931 than in 1930 and 1 (Miami) was stationary. Norfolk again shows an increase and bids fair to have a higher average for the 1930 quinquennium than for the preceding 10 years. Washington also is not quite maintaining its excellent 1926-1930 average of 2.8.

The cities in the East North Central group led all the others in their low typhoid average for 1931. This is in spite of the fact that in Cleveland 20 out of 31 deaths occurred in an outbreak at the State Hospital for the Insane. Without these deaths, the Cleveland rate, would be 1.2 instead of 3.4. The rates in Milwaukee (0.3), Chicago (0.4), and Cincinnati (0.4) continue amazingly low. South Bend, which was first reported among the cities with a population of over 100,000

in 1930, ends its second consecutive year without a typhoid fever death. Detroit seems definitely to have come out of its typhoid period and ranks among the best. This great group of Middle Western cities with nearly 10,000,000 population appears headed toward an almost complete elimination of typhoid.

The cities in the East South Central states have, as is well known, a more difficult problem than those in some other parts of the country. The great reduction in the Nashville rate for 1931 (from 12.3 in 1930 to 3.2 in 1931) is especially noteworthy. This is by far the lowest rate ever reported in that city. Birmingham also breaks its lowest previous record with a rate of 3.0. Memphis, on the other hand, shows an increase from 4.7 in 1930 to 7.3 in 1931, and Knoxville with a rate of 7.3 is also a backslider.

The cities in the West North Central states made their best group record in 1931, Des Moines and Wichita getting a place on the honor roll, with no typhoid deaths, while Minneapolis, Duluth and St. Paul are not far behind. St. Louis continues its excellent record.

The cities in the West South Central states are, as heretofore, relatively high in typhoid as compared with those in other parts of the country, the average for the group in 1931 being about 7 times as high as the averages for the cities in the New England, Middle Atlantic, East North Central and Mountain and Pacific groups. The increased rate in 1931 appears to be due largely

to the increase in the New Orleans rate, from 6.5 in 1930 to 13.9 in 1931. This city, however, is apparently one of those suffering from a high nonresident rate, 48 of the 65 typhoid deaths in 1931 being reported as among nonresidents. Dallas again seems to have more of a typhoid problem than Houston, San Antonio, or Fort Worth. The El Paso rate seems to be coming down satisfactorily.

The cities in the Mountain and Pacific states made a particularly good record for 1931, nearly all of them showing rates as good as or better than those for 1930, thus bringing the group as a whole into close competition with the Eastern states. The typhoid death rate for the Mountain and Pacific cities as a group was 1.07 in 1931. Denver, however, is out of line and had a higher rate (3.4) in 1931 than its 1926-1930 average (2.6).

Twelve of the 93 cities state that no typhoid deaths occurred within their limits in 1931. This is the largest number of cities with perfectly clear records ever reported in these summaries.

The total typhoid rate for the 78 cities whose records are available for the whole 21-year period is almost exactly the same as for the 2 preceding years.

It is too soon to conclude that a stable period in the urban typhoid rate has been reached for the whole country. In the light of past experience, it seems probable that a further decline will be witnessed.—*J.A.M.A.*, 98:1550-1552 (Apr. 30), 1932.

# PUBLIC HEALTH ENGINEERING

## A RURAL SCHOOL SANITATION PROGRAM\*

THE 1930 report of the committee, submitted under the chairmanship of V. M. Ehlers, constitutes a comprehensive study of the activities of various state health departments as regards the field of environmental sanitation. This report was in the nature of a stock taking or survey of the entire field.

The individual sections of the conclusions, together with pertinent portions of the report itself, were brought to the attention of the various committees of the section as a matter of information.

This year, the committee considers it desirable to submit information on a program for rural school sanitation and on suggested standards for it. One of the committee members, W. Scott Johnson, has made this a subject of special study, and has prepared the accompanying brief. It was thought that an outline of a rural school sanitation program already in effect, containing standards and a working plan, would be of maximum interest. One of the most in-

teresting and valuable points brought out in this brief is the importance and value of a rating plan to evaluate the results of the school inspections. This provides the incentive of friendly competition and check-up to insure most thorough work and effort in securing the necessary corrections of any unsatisfactory and unhealthful conditions. Copies of the standard survey report and rating schedule are given with Mr. Johnson's brief. A detailed outline of the standards, giving public health reason for them and information as to satisfactory compliance, is too lengthy to give in this report but is available in mimeographed form.

It is the purpose of the committee, if continued for the coming year, to select another of the subjects recommended in last year's report for the preparation of suggested standards.

GEORGE W. PUTNAM, *Chairman*

A. H. BERRY

W. W. DEBERARD

C. G. GILLESPIE

ANASTASIO GUZMAN

W. S. JOHNSON

A. E. LEGARE

L. B. REYNOLDS

JANE H. RIDER.

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\* Report of Committee on Promotion of Environmental Sanitation, presented to the Public Health Engineering Section of the American Public Health Association, at the Sixtieth Annual Meeting at Montreal, Canada, September 17, 1931.

## RURAL SCHOOL SANITATION PROGRAM IN MISSOURI

W. SCOTT JOHNSON

*State Board of Health, Jefferson City, Mo.*

OVER a period of years the Division of Public Health Engineering and Sanitation of the State Board of Health of Missouri has developed a program designed to secure better rural school sanitation. Without going into the reasons for this work or the various steps by which the plan reached its present stage, a brief outline of this program as it is working today is sub-

mitted, together with certain results obtained and defects that have become apparent.

The essential features of this rural school sanitation program follow:

1. Annual inspections are required of all rural schools by deputy state health commissioners or their agents in accordance with the regulations of the State Board of Health.

2. Development of regulations and standards of rural school sanitation by the Division of Public Health Engineering and Sanitation; also a survey blank used by the deputy state health commissioners in their annual survey. This is a comprehensive yet concise survey blank requiring only those items to be marked by an (X) which are not satisfactorily complied with and require correction. (See accompanying survey blank.) One copy of this survey report is sent to the school directors, one to the State Board of Health, and one retained by the local health officer. Water containers are furnished by the State Board of Health to the deputy state health commissioners with instructions to collect samples for bacteriological analysis only from properly constructed school wells.

A system of numerically rating school sanitation, using data from the survey sheets submitted by the deputy state health commissioners, was developed by the Engineering Department. This rating can be applied to a single school, all schools in a given county, or to all schools in the state concerning which sanitary surveys have been made out. The ratings furnish an important means of evaluating the results of this work in numerical terms. The attached table indicates the method of rating schools for the entire state.

For example—of the 5,715 schools inspected in the state, 3,899, or 51 per cent. complied with the State Board of Health standards governing drinking water supplies, the possible score for

this item being 40 then the "score earned" under drinking water is 51 per cent of 40, or 20.4.

In the last column, the total of the nine scores is shown as the state score for rural school sanitation. Sanitary scores are also computed for the schools surveyed, on a county basis.

Representatives of the Division of Public Health Engineering and Sanitation have a conference on school sanitation at least once each year with the deputy state health commissioners, in order to encourage the making of school inspections and to instruct them in the technic of school inspections. Usually one or two schools are inspected by the health officer in company with the health department representative.

3. The closest coöperation is maintained with the Education Department and county superintendents, of schools in all matters pertaining to school sanitation. The State Education Department has adopted the State Board of Health standards for rural school sanitation and, further, will not approve any school for a first class rating until sanitation is approved by the State Board of Health. Inspections of all schools for a first class rating are made by personnel from the Engineering Department.

4. The program is essentially educational in character, and persuasive methods for securing improvements prevail, although in a few cases deputy state health commissioners have, with the backing of the State Board of Health, closed schools until sanitary conditions met requirements. As much publicity as possible is given to the importance of satisfactory school sanitation by articles appearing in the press and the *Missouri Public Health News*, as well as public talks before meetings of teachers, school directors, women's organizations, and the general public.

Each year improvements have been made in this program, and the results

indicate material progress. Last year inspections were made of rural schools in 86 of the 114 counties, indicating an increase of 24 per cent over 1929. Of the 8,000 rural schools, 5,715 were inspected, indicating an increase of 23 per cent in 1930 over 1929. The numerical sanitary rating of rural schools in many counties has shown considerable increase, although the state rating has not shown a corresponding improvement. This is explained by the fact that 21 new counties were added last year in which no previous school sanitation work had been done, and the low rating of these balanced the increases in the other counties.

The success of this work is to a certain degree hampered by the following:

1. No law exists requiring the approval of plans for new school buildings.

2. There is need for better training of deputy state health commissioners in the details of school inspections.

3. Inadequate compensation of

deputy state health commissioners by the county courts for school inspection work is a hindrance in several counties.

4. Improved and more complete standards of sanitation for rural schools, including particularly, detailed explanation of the health reason and what constitutes satisfactory compliance.

Certain of these defects will be eliminated in the near future. Under a new state educational law, better supervision of building construction and location will be possible. The deputy state health commissioners are being trained to make more accurate inspections each year by representatives of the State Board of Health. The problem of better compensation for the local health officials is not being solved satisfactorily, except as the number of full-time county health units increase. Improved standards of rural school sanitation are being developed. The first step includes the code on school sanitation giving each regulation followed by the public health

STATE RURAL SCHOOL SANITATION SCORE  
STATE BOARD OF HEALTH OF MISSOURI

School Site Possible Score 5		Building Possible Score 5		Water Supply Possible Score 40		Toilets Possible Score 20		Ventilation Possible Score 5	
Per Cent Com- plying	Score	Per Cent Com- plying	Score	Per Cent Com- plying	Score	Per Cent Com- plying	Score	Per Cent Com- plying	Score
91	4.6	88	4.4	51	20.4	37	7.4	40	2.0

Heating Possible Score 5		Lighting Possible Score 5		Cleaning Possible Score 5		Personal Hygiene Possible Score 5		Score for Entire State
Per Cent Com- plying	Score	Per Cent Com- plying	Score	Per Cent Com- plying	Score	Per Cent Com- plying	Score	
54	2.7	52	5.2	95	4.7	66	3.3	54.7

reason for the same and an outline of what constitutes satisfactory compliance. It is proposed to expand this code further and print it with numerous cuts showing satisfactory sanitary equipment, more detailed description of the construction features, and the health reasons for each item of sanitation.

STATE BOARD OF HEALTH OF MISSOURI

SCHOOL SANITATION INSPECTION REPORT

Form S. E. 2

School ..... No. of Pupils Enrolled .....

District No. .... Name of Clerk ..... Address .....

County ..... Date ..... 193.....

BOARD OF DIRECTORS,  
Gentlemen:

An inspection of your school was made on the above date, and your attention is respectfully called to the following items marked (X) which do not comply with the State Board of Health regulations on school sanitation. I request that the defects indicated below be corrected in compliance with the enclosed regulations.

Sec.\*

- 2 Site: Ample area.....( ).  
Clean, well drained.....( ).
- 3 Building: Solidly constructed; good repair.....( ).
- 4 Drinking Water: Good location.....( ).  
Proper construction.....( ).  
Safe analysis.....( ).  
Individual cups or fountain.....( ).
- 5 Toilets: Good location.....( ).  
Proper construction.....( ).  
Maintenance.....( ).
- 6 Ventilation: 15 sq. ft. floor area per pupil.....( ).  
Shields on windows.....( ).
- 7 Heating: Jacket around stove.....( ).  
Thermometer .....( ).
- 8 Lighting: Light from left or left and rear of pupils.....( ).  
Window space 20% of floor area.....( ).
- 9 Cleaning: Floors clean.....( ).
- 10 Personal Hygiene: Soap, water, and individual towels provided.....( ).

Improvements Since Last Inspected.....

Board Members Present at Time of Survey.....

Remarks: .....

Name of Teacher.....Address.....

Inspected By.....

\* Section numbers correspond to sections in Part IV, Book V, of the State Board of Health regulations.



## INDUSTRIAL HYGIENE

**Results of Profit-Sharing Plan of Sears, Roebuck & Company During the Depression**—This company has a profit-sharing plan started by Julius Rosenwald in 1916. Employees, after one year's service with the company, may become members of the fund and are then required to contribute 5 per cent of their earnings up to \$300 per month. The company's contribution amounts to  $7\frac{1}{2}$  per cent of its earnings before deductions of federal taxes and dividends, and credits to the individual employees' accounts are made on the basis of 1 share to employees with less than 5 years of service,  $1\frac{1}{2}$  shares to those with service from 5 to 10 years, and 2 shares to those with 10 or more years of service. In 1931 the company's contribution amounted to \$1,000,000, and in only two or three particularly bad years has it been less than  $2\frac{1}{2}$  times the deposits of the employees for the year. The funds are invested in the stock of the company purchased at as low a figure as possible.

The plan provides that

. . . after 10 years' service an employee may withdraw and receive his full share of the fund, including the company contributions. An employee with less than 10 years' service receives only his own deposits with 5 per cent interest, unless he is dismissed through no fault of his own, when he receives the full amount. Women who leave the company to get married receive the full amount to their credit if they have had at least 5 years' service, and in case of death the full amount is paid to the heirs or to the estate of the employee.

When the plan was started Mr. Rosenwald stated that its purpose was to permit employees who remained with the company to accumulate a fund which would be adequate to provide for them upon retirement and also to provide an income for employees with long enough service records who do not

remain with the company through their entire business life. The plan also was in part inspired by the desire to secure a stable working force with the lowest possible turnover and to stimulate interest in the success of the company among the employees.

Instances of individual receipts under the plan are cited. Thus a negro porter who was retired a short time ago after 14 years' service drew out \$14,000. His maximum salary had been \$28 a week and his total contributions to the savings fund amounted to \$800. A woman employee who had received a salary well above the average retired recently after a long period of service. She found that her share of the savings fund, invested at 6 per cent, would provide her with an income which was within \$10 a month of her former salary. The average totals accumulated under the plan in 10 years are equal to about 15 times the amount actually contributed by the employee, and this ratio increases rapidly as the period of service lengthens. *Month. Labor Rev.*, 34, 5:1066-1067 (May), 1932.

L. G.

**The Reactions of the Organism to Repeated Electric Shocks (Author's summary)**—Rats were subjected to repeated contacts with electric circuits at 3-day intervals. After contact with a circuit of 248 volts, a certain proportion of the animals showed a paralysis of the hind legs. The incidence of paralysis decreased rapidly with subsequent shocks and disappeared entirely even though the voltage was raised to 1,000 volts. This suggests either that the rats susceptible to the electric current are injured with the first shocks or that they become immune to electricity.

In favor of the latter hypothesis is the fact that the respiratory paralysis and the time required for recovery decreased steadily with increase in the number of shocks. The mechanism of the paralysis is discussed. After a number of shocks

certain rats developed disturbances of equilibrium, priapism, and other signs of hyperirritability of the nervous system.—O. R. Langworthy and W. B. Kouwenhoven, *J. Indust. Hyg.*, XIV, 5:197-205 (May), 1932. L. G.

**Relation Between Industrial Home Work and Business Depression**—In a recent study made by the Division of Women in Industry of the New York State Department of Labor an attempt was made to determine the amount of home work in licensed tenements. The figures are based on the reports of home work inspectors whose duty it is regularly to inspect tenements licensed for home work.

Contrary to what might be expected the results seem to indicate that in periods of depression home work falls off more sharply than factory work.—*Month. Labor Rev.*, 34, 5:1055-1056 (May), 1932. L. G.

**Cadmium Poisoning: II. Experimental Cadmium Poisoning**—This contribution is a continuation of one previously reported in the literature on cadmium poisoning. In the present study cadmium oxide and dust was administered to cats by the respiratory and by the gastrointestinal routes.

By inhalation cadmium oxide fumes or dust produces an increase in the respiratory rate and abundant salivation. Edema of the lungs results from high concentrations with death of the test animals. In smaller amounts pneumonia, bronchopneumonia, emphysema, and atelactasis are produced. Cadmium oxide also produces changes in the liver varying from granulation of the cells to a pronounced fatty infiltration. Fatty infiltration of the kidneys was also found.

With cadmium sulphide dust inhalation, symptoms became manifest after 24 to 36 hours. These consisted in vomiting, diarrhea, increased respiration

and dyspnea. Pneumonia and the lung damage was similar to that produced by cadmium oxide.

The feeding of large doses of cadmium carbonate or phosphate induces vomiting with salivation and loss of appetite. This is absent when small doses are used. Pathology of the liver and kidneys was noted as a result of these feeding experiments. No definite blood changes were observed in these experiments.

In the inhalation experiments cadmium was found to be stored in the lungs, liver, and kidneys, and later in the bones. In the feeding experiments cadmium was retained by the liver and kidneys but the bones also retained some of the material.

Tests with the Burrell mask and Wilson bag respirator for the protection against cadmium oxide and cadmium chloride revealed efficiencies ranging from 73 to 96 per cent.—Leon Prodan, *J. Indust. Hyg.*, XIV, 5:174-196 (May), 1932. L. G.

**On the Effects of Prolonged Exposure to Sulphur Dioxide**—This study is based on the examination of 100 controls and 100 workers exposed to sulphur dioxide gas in industrial occupations. Among the exposed group were 47 employees who had a duration of exposure of from 4 to 12 years. The concentrations of gas in the atmosphere varied approximately from 5 to 70 p.p.m. by volume.

The workers were given physical examinations, and X-ray pictures of their chests were made, as well as blood and urine studies. Biometric studies showed that the two groups were, for all practical purposes, highly comparable. Blood studies showed the control group to have approximately 4 per cent higher polymorphonuclear leukocyte counts and 3 per cent lower lymphocyte counts. Pharyngitis, tonsillitis, and abnormal reflexes were somewhat higher in the

exposed group and the exposed group also presented a considerably larger number of cases of acid urine than did the control group.

The symptoms which showed an increase in the exposed group over the control group were shortness of breath on exertion, increased fatigability during employment, and altered sense of taste or smell. The X-ray findings were essentially the same in both groups. Finally, the incidence of colds was not found to be significantly different in the two groups. The duration of colds was somewhat greater in the exposed group than in the unexposed group.—R. A. Kehoe, F. M. Willard, K. Kitzmiller, and T. J. LeBlanc, *J. Indust. Hyg.*, XIV, 5:159-173 (May), 1932. L. G.

**The Best Temperature for Light Work—The Variance of Working Capacities Under Different Air Conditions**—This paper reports the first of a series of studies of the Holland Air Conditioning Research Program sponsored by the Holland Furnace Company. The program on the physiological effects of air environment was originally planned under three general headings:

First, in investigation of the effects of various conditions on sleep; second, the effect of various air conditions on the capacity for light work; and third, the effect of various air conditions on the capacity for hard work.

In order to carry out this program an insulated room was constructed, about 10 ft. by 10 ft. in floor area, with a ceiling height of 8 ft. The insulation was applied to the inner walls and painted with water-proof paint and varnish. Direct expansion coils were suspended from the ceiling, air circulation was obtained by means of an oscillating fan. The coils have an approximate cooling capacity of 800 B.t.u. per hour. Electric heaters, a steam jet humidifier, and a Silica Gel dehumidifier were also installed. The tests on subjects doing light and hard work are all conducted in this room.

Artists' models were used as the subjects of these experiments and sorting

tests were used as a basis of determining the most suitable atmospheric conditions for light work. The tests consisted in sorting 5 different types of objects from a bowl into suitable boxes, deductions being made for errors in performance. Seven subjects were used in the beginning of this study but later on, owing to the incomplete number of tests, the results of 3 of the subjects' tests were utilized.

From the tests on nude subjects the author concludes:

A summary analysis of these average composite curves shows that the shortest time intervals elapsed within the following temperature ranges:

Dry bulb	83° to 90°
Wet bulb	63° to 78°
Effective temperature	72° to 83°
Relative humidity	45% to 48%

The time interval increases appear to be fairly gradual on the low side of the above mentioned temperature and humidity ranges, while on the upper portion of the scale the temperature curves increase somewhat more sharply and in rather constant increments.

In the tests on clothed subjects the composite curves showed that the shortest average time interval took place under the following average conditions of 75° to 86° dry bulb, 65° to 70° wet bulb, 72° to 77° effective temperature and 58 per cent to 62 per cent relative humidity. On this point the author says:

In looking over the curves of the individual subjects one cannot escape the conviction that the data are insufficient for more definite conclusions. We cannot as yet say that a certain temperature is the best for light work as the average in the points determined makes the curves somewhat indefinite.

When, however, we examine the composite curves the conclusion appears reasonable that the elapsed time for performing the sorting tests drops rather definitely to a certain low point and then ascends. The curves indicate higher temperatures, either the dry bulb or the effective temperature, than are usually considered desirable for work of this kind.

—E. V. Hill, *The Acrologist*, VIII, 5:5-12 (May), 1932. L. G.

## FOOD AND NUTRITION

### Action of an Aerobic Spore-Forming Organism on Evaporated Milk—

An outbreak of coagulation in evaporated milk was studied by the authors. Many cans of the spoiled milk were examined bacteriologically and, while most of them failed to yield an organism, an aerobic, spore-forming bacillus, later identified as *Bacillus cereus*, was isolated from three cans, all of which came from one batch of milk. This organism curdled cans of evaporated milk slowly at 37° C. with no change in the odor and flavor, unless the incubation period was extended, and could be found microscopically for only a short time after inoculation and then only in small numbers. If inoculated evaporated milk was provided with a satisfactory supply of air by transferring it to test tubes, removing a part of the milk from a can or in some other way, the organism curdled the milk rapidly, produced an objectionable odor and flavor and could be found in large numbers microscopically.

Since the organism was found in only three of the many cans of milk examined, it did not appear to be the primary cause of the outbreak. Additional evidence along this line was provided, (a) by the survival of the organism in inoculated milk at 37° C. for extended periods so that it is improbable that the organism had died in the milk failing to yield it, and (b) by an increase in the soluble and amino nitrogen in evaporated milk that coagulated following inoculation with the organism, while the soluble and amino nitrogen in milk from the outbreak were the same as in normal evaporated milk.

Normal cans of evaporated milk showed changes on extended incubation

at 37° C.; these included partial curdling, an increase in color and a change in the odor and flavor. Various lots of evaporated milk behaved differently and pronounced differences between brands were encountered. The results suggest that there are variations in the condition of the milk from the standpoint of its resistance to changes by heat. The outbreak of coagulation supplying the milk studied occurred at a time when the atmospheric temperatures were very high, so that a tendency to an instability to heat would have been much more likely to result in coagulation than at other seasons.

The striking thing in connection with the action of *B. cereus* in cans of evaporated milk was the coagulation with no change in the odor or flavor, unless the incubation period was extended.—B. W. Hammer and R. V. Hussong, *J. Dairy Sci.*, 15:220 (May), 1932.

**Vitamin Content of Three Varieties of Spinach**—Studies were made with three varieties of spinach—Virginia Savoy, Princess Juliana, and Viroflay—to determine whether any correlation existed between vitamin potency and leaf type or leaf color. The vitamins A and B content of the three varieties of spinach tested were about equal. Results indicated that Princess Juliana probably contained slightly less of vitamin C than the Virginia Savoy and Viroflay. No relationship between leaf type and vitamin A or B content was detected. The variety with heavily savoyed, bluish-green leaves seemed slightly less potent in vitamin C than the other two varieties.—Hilda Black Kifer and Hazel E. Munsell, *J. Agri. Res.*, 44:767 (May 15), 1932.

**Ferrous Iodide as a Substitute for Vitamin A in Rats**—This is a report of a reinvestigation of a claim made (*Science* 68, 1766, 432, 1928) that small doses of syrup of ferrous iodide can substitute for vitamin A in the cure of xerophthalmia and promotion of growth in rats on vitamin-A deficient diets.

Albino rats from a stock raised for generations on Sherman Diet 13 were placed at 4 weeks of age on Sherman vitamin-A free diet 380 plus irradiated ergosterol (1 mg. per 1,000 gm. of diet). Two series were studied—one in which the syrup of ferrous iodide was given as curative measure after xerophthalmia had developed, and the other in which the iodide solution was given as a preventive measure.

In Series I, 45 rats were given iodide treatment daily, when xerophthalmia appeared—usually at about 9 weeks, when constant weight was reached. Iodide treatment had no effect whatever on the incidence of terminal infections of the glands about the mouth so characteristic of vitamin A deficient rats. In 100 per cent of the animals, both with and without iodide treatment, pus was found at death in one or more of the following loci: submaxillary gland, sublingual gland, thyroid, nasal sinuses, and frequently in the middle ear. Death was hastened by ferrous iodide, by an average of 12 days; although the weight at death was about the same for iodide treated as for untreated rats, the difference being 5 gm. or less. Food consumption was less in the iodide treated rats, the average difference being 25 gm.

In Series II, 18 rats were given daily doses of 3 or 5 drops of dilute syrup of ferrous iodide from the beginning of the experimental period until their death. When so given, the iodide had no effect upon the incidence of terminal infections of the glands about the mouth, nor upon the incidence or course of

xerophthalmia, although it did delay the onset of xerophthalmia, and the time of appearance of constant weight and death. It also increased food consumption.

These results confirm previous work in which it was shown that syrup of ferrous iodide was without effect on the xerophthalmia of vitamin A deficient rats, and further show that ferrous iodide cannot substitute for vitamin A in the cure or prevention of terminal infections characteristic of vitamin A deficiency in rats.—Hazel C. Cameron, *Science*, 76:19, 1957 (July 1), 1932.

**Vitamin B Complex**—Ross and Robertson placed a group of young rats on a vitamin B free diet, and a second group on a similar diet plus 6 per cent dried brewer's yeast. Both groups were infected by mouth with an enteritidis organism. Of 53 rats on the diet deficient in vitamin B, 10, or 19 per cent, survived the infection, whereas of 51 rates given the yeast in addition, 38, or 75 per cent, survived the infection. The authors conclude that the addition of the vitamin B complex to the diet lacking in this factor increased the resistance of the rats against infection.—J. R. Ross and Elizabeth Chant Robertson, *Am. J. Dis. Child.*, 43:547 (Mar.), 1932. Abstract, *J. A. M. A.*, 98:2317 (June 25), 1932.

**Growth under Vita Glass**—The fact that many experiments with vita glass have been uncontrolled and that there has been difficulty in determining what is a "normal" human being, was responsible for this undertaking with rats in a controlled experiment. Pedigreed albino rats were used—two groups of males and females under ordinary and under vita glass, and two mixed groups under each glass. Healthy animals, 30 to 32 days old, were used and maintained during the experimental period on an adequate diet (Sherman B.

*ad libitum*). Weighings were made every alternate day, and the experimental period was from the first of March to the end of October. During this period the growth curves of the groups are essentially identical; that is, no difference between those under ordinary glass and those under vita glass.

In discussing the results, the authors raise the question as to whether any growth above normal which may be exhibited by experimental animals under vita glass is of any biological value; in other words, that the normal growth may be optimal growth. Other factors are discussed such as the intensity of ultra-violet radiation and the transmission factor of the glass. In this experiment too the animals are exposed to direct sunlight which is not usually possible with humans in ordinary house construction.

Reference is also made to the meager supply of ultra-violet radiation in winter, the loss in transmission through the glass which must be scrupulously clean, the importance of exposure to direct sunlight, the necessity for removing clothing, and the high cost.

As an additional experiment, 20 rats were divided—10 under vita glass, and 10 under window glass, and exposed to a mercury vapor lamp on alternate days, 4 feet from the burner. Growth curves were the same as in the previous experiment.—Ian N. Sutherland, *J. Hyg.*, 32:211 (Apr.), 1932.

**A Study of the Calcium Retention on a Diet Containing American Cheddar Cheese**—Two healthy young women, weighing 51.3 and 50.2 kg. were the subject of an experiment to determine the utilization of the calcium of cheese, since milk is rich in calcium and no experiments were previously reported on the availability of calcium in Cheddar cheese. The calcium content of the American Cheddar used in this work was 0.74 per cent. The studies

included 18 consecutive days of two 9-day periods each—one on cheese diet and the other on pasteurized milk. During this time the subjects were not exposed to direct sunlight.

The cheese was made from milk subjected to flash pasteurization at 160° F. and the milk used was fresh, pasteurized at 142° to 145° F. In the two subjects the cheese supplied 86 and 85.7 per cent of the total calcium and the milk 87.7 and 87.4 per cent. The average daily calcium intake on cheese diet was 10.2 mg. per kg. and on the milk diet, 9.4 mg. per kg. body weight sufficient for calcium equilibrium as indicated by previous investigators. The daily average balances of the cheese diets were +0.005 gm. and -0.040 gm., and on the milk diets these balances were -0.010 and -0.031 gm.

One subject showed a negligible positive balance on cheese and a negligible negative balance on milk, or almost remained in calcium equilibrium. The other subject showed slight negative balance both on the cheese and the milk diets, indicating no essential difference between the utilization of the calcium in cheese and that of pasteurized milk.—Marguerite G. Mallon, L. Margaret Johnson and Clara R. Darby, *J. Nutrition*, 5:121 (Mar.), 1932.

**Failures to Produce Experimental Dental Caries in the White Rat with High Carbohydrate Diet and Bacillus Acidophilus or with Vitamin D Deficiency**—Reference is made to the modern scientific studies of dental caries including the parasite theory, the fermentation of carbohydrate materials, influence of Lactobacillus acidophilus and the effect of vitamin C and vitamin D deficiency.

To offset the possible effect of the faulty nutritional condition of the mother during gestation, the experimental animals were the fifth generation of an inbred stock on a liberal diet which

was evidenced by the large size of the animals at weaning time. Thirty-day old animals were given an adequate diet supplemented with Viosterol, fresh green cabbage, and brewer's yeast. The ears of both groups were infected with pure cultures of *B. acidophilus*.

At the end of 9 months the rats were killed and examined for dental caries but none was found. Similar results occurred when cabbage was replaced by lettuce and the starch replaced by sucrose, and in addition to inoculation the teeth and gums were rubbed daily with cultures of *B. acidophilus*.

In a second series on a rachitogenic diet, 4 out of 10 rats received an addition of Viosterol. Three of the 4 rats which survived the 13-months period gave no evidence of rickets or bone or joint deformities. Those on the rachitogenic diet without Viosterol showed marked rickets, bone and joint deformities, but the teeth in all of the series exhibited no caries. In all cases the teeth were removed, carefully cleaned, polished and sectioned, and no microscopical evidence of caries was found.—C. A. Lilly, *J. Nutrition*, 5:175 (Mar.), 1932.

**Recent Studies of the Vitamin A and C Content of Dried Apricots and Figs**—The vitamin C content of fresh

Calimyrna and Kadota figs is about one-half that of fresh peaches or prunes, 20 to 30 gm. daily protecting a standard guinea pig against scurvy. Mission figs show less antiscorbutic effect.

The dried figs (Calimyrna and Mission) retained little of this vitamin whether the figs were sulphured or unsulphured, indicating in this fruit that sulphuring does not protect vitamin C in drying. Calimyrna, Kadota and Mission figs contain more vitamin A than grapes but less than apricots, peaches and prunes. In the dried Missions and Calimyrnas sulphuring protected somewhat the vitamin A, dried Missions losing four-fifths unsulphured as against one-half when sulphured.

Cooking of fresh apricots reduced the vitamin content more than in the case of sulphured dried apricots. There is slightly greater loss of vitamin A in cooking unsulphured fruit than with the sulphured. After 6 months storage, dried sulphured apricots, whether raw or cooked, retained about one-half the vitamin C of the fresh fruit. The stored fruit contained 18 to 29 per cent of vitamin A which was not affected by cooking. Apricots are a rich source of vitamin A even after a loss of 70 to 85 per cent of this accessory.—Agnes Fay Morgan, Anna Field and P. F. Nichols, *Fruit Prod. J.*, June, 1932, p. 304.

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**Investigations Concerning the Effect of Ultra-Violet Light on the Bacterial Content of Milk and of Water**—Experiments were made on the bactericidal action of ultra-violet light on milk and on water using Wamoscher, Hanua, Scheidt, and Vita-Ray-Gesellschaft forms of apparatus. Disinfection of milk by ultra-violet light was unsatisfactory. The rays never destroyed

as many bacteria as pasteurization. In clear water the rays destroyed 99 per cent of the bacteria so that with the high bacterial content generally found in practice, disinfection was not satisfactory.—L. Vogeler, *Milchwirtschaftliche Lit.-Bern.*, 1930, 41:484; *Wass. u. Abwass.*, 28:100, 1931. From *Summary of Current Literature, Water Pollution Research*, V, 4 (Apr.), 1932.

# CHILD HYGIENE

## CHILDHOOD AND THE DEPRESSION

IT is high time to take stock of what is happening to the childhood of our country in this prolonged period of depression. So many loose and ill-advised statements have been made recently regarding the "high health" of American children, that we should turn to those who are in intimate daily contact with medical and social problems, in order to correct false impressions.

While it is true that the infant mortality rate has continued to decline and that the babies of this country have been, on the whole, well provided for, it by no means indicates that our pre-school and school children are in a satisfactory condition. On the contrary, reports coming in from various sections of the country state that malnutrition and undernutrition appear to be on the increase, and that it is only through heroic efforts to feed our school population that the children are barely kept from stepping over the starvation line. But physical deterioration is not the only effect of such a period. Social maladjustments and delinquency are multiplying. The widespread uncertainty and instability of family life seriously affect the children.

The results of depression upon childhood have been set forth clearly in a pamphlet published by the National Education Association.\* After discussing the financing of education during this depression, the report takes up the increased responsibilities of auxiliary school services.

Along with the increase in attendance, many public school systems are being called upon to operate or to supervise the operation of

special non-educational and relief services. Like the increase in attendance, this tendency is merely a temporarily accelerated part of a movement to assign ever increasing child welfare responsibilities to the schools. Whether such responsibilities are a legitimate school function is not the question at issue. The facts are that such relief functions have frequently been allotted to the schools, and that current economic conditions make this work more difficult and expensive. Perhaps the most important relief function assigned to the schools is the supplying of clothing and one or more meals daily to destitute children.

In a few cities the actual operating expense of these services is assumed by the school system, but in most cases the food and clothing are supplied through the American National Red Cross, the American Friends Society, or through other national or local relief agencies. The cost of administering the relief, however, is often handled in part or whole through the school budget. Other auxiliary school services which are probably carrying an unusually increased load due to the depression include: medical and dental clinics, school nurses' services, vocational guidance, libraries, social case work, and free textbooks and supplies for indigent children.

An important phase of the relief work for which schools are being held responsible is the financial contribution of the teaching profession to local relief funds. On September 18, 1931, the President of the National Education Association issued a message on relief, commending the activities of teachers in relief work and urging "that every member of the profession extend immediate aid to make effective the plans and policies of regularly constituted relief agencies." While even an estimate of the amount contributed by teachers to relief work is impossible, the total is certainly a large one. A few examples will serve to show the general nature of the work done.

In New York City, for example, the school relief fund contributed by the school employees was \$452,000 in 1930-1931 and \$1,000,000 in 1931-1932. Teachers forwarded to the relief committee 2 or 3 per cent of their salaries. The extent of the school relief program may be glimpsed from the following facts for 1930-1931. Many of these figures will be more than doubled in 1931-1932.

\* *Childhood and the Depression*, National Education Association, Washington, D. C.



Free lunches served in a single week	9,800
Pairs of shoes distributed	61,500
Garments distributed	120,000
Cost of milk and crackers, alone	\$26,000

The responsibilities of the teachers are suggested by the following statement:

Teachers and other employees are to detect and investigate need and extend immediate help. Thus the teachers are at once contributors to the huge charity fund, the social workers that discover and inquire into the poor pupils' wants, the direct disbursers of free lunches, shoes, and clothing, and also the bookkeepers and administrators of the funds.

In Newark, N. J., the City Teachers Association organized, at the suggestion of the superintendent, with the approval of the Board of Education, a central relief committee. A fund of \$18,851 was raised from school employees by the first appeal. Cooperation with the Social Service Bureau and with other welfare agencies was immediately established. The program of relief was maintained on a 12-month basis through 1931. A few facts concerning the work of the Newark school relief fund follow:

Pairs of shoes bought	3,170
Number of children served milk	2,853
Total number of meals served	53,328
Total number of pupils assisted	8,047

The fund was used entirely for relief, the small administrative overhead being paid for by the public school system.

From Kansas City, Mo., comes the report that teachers increased their giving to the Community Chest 75 per cent over last year. Teachers are cooperating in the relief work of the Junior Red Cross, and school nurses are paying for needed medicine when the family cannot do so. In Detroit, \$26,488.81 was contributed last year to the Mayor's Unemployment Relief Fund by the teaching force and the present rate of contribution is \$4,000 a month. In Chicago, 11,000 hungry school children were given food by teachers who were themselves financially embarrassed by the failure of the Board of Education to pay them.

The general scope of the program carried on in Philadelphia is suggested by the following report.

Early in 1920 officials of the public school's medical inspection division discovered that many children were seriously under-nourished. Investigation showed that hundreds were coming to school without having had breakfast. A committee of

school executives was appointed to consider the situation. While it was felt that serving breakfasts in school was not of itself a function of the school system, the teachers could not instruct children who were suffering from the pangs of hunger. The principals of all schools pledged unanimous cooperation to meet the emergency. Contributions came in without solicitation. Teachers, clubs, school entertainments, interscholastic football games, and individual philanthropists contributed money and food.

Breakfasts were served to the children in 128 school buildings and in 3 special centers. The breakfasts were available daily, including Saturdays, Sundays, and holidays. The serving was supervised by principals and teachers in the schools, and in many cases the actual preparation and serving of the food was done by the same persons. The largest number of children served in a single day was approximately 8,600. The average gross cost of each breakfast was approximately 8 cents.

In order to avoid undue imposition by those not needing or deserving this care, a monthly check-up was made of each individual case. The details of the diet were worked out by the Medical Inspection Division, the Director of Home Economics, and the Director of School Lunches. The breakfasts were planned early enough in the morning so that the children thus fed might rejoin their companions before the actual opening of school, thus reducing the publicity that might attach to these children.

The work of a single school in Fresno, Calif., is thus described by its principal:

As many children as possible are furnished lunches by the Parent Teacher Association, but many lunches are paid for by the cafeteria manager, teacher, and principal. During 1930-1931, clothing and shoes for over 25 children . . . A large part was paid for personally by interested teachers . . . Teachers this year have over-subscribed their quota to the Community Chest by 25 per cent. Teachers come in intimate daily contact with children who are hungry and not properly clothed, and they are supplying the need as best they can from their own funds. They are not giving unintelligently. Each case is investigated by the school nurse at the request of the teacher. Deserving and eligible cases are referred to the Community Chest or the County Welfare Department. But the available aid is frequently not adequate.

Then the school steps in, supplying things that are needed, through teachers, personal contributions, P. T. A. or Student Body funds—in any event supplying the need.

. . . A careful study of the effect of the current depression on child health and welfare is badly needed. Lacking an exact statement, however, we may rely on the reports of competent social workers and upon studies of child welfare made in previous depressions.

The evidence from the latter source is perhaps best represented by a study of unemployment and child welfare conducted during the industrial depression of 1921–1922.

The study attempted to show, as nearly as possible, a cross-section of conditions in the families of unemployed men in two cities in which wages had been high. Some of the conclusions follow:

1. *Lowered standard of living*—Half of the families from which complete information was secured spent for their maintenance during unemployment only one-half as much as while the father was working. "The children are drinking tea and coffee instead of milk," was a common report. Frugality in food, even to the point of actual privation, a dangerous saving of fuel, economy in clothing and household supplies, reduction of the housing cost through seeking cheaper quarters or crowding the family to secure an income from lodgers are among the results of unemployment.

2. *Employment of the mother*—Almost one-third of the mothers in the families of unemployed men were gainfully employed. Many other mothers were seeking work. Three-fourths of the working mothers were employed away from home. The absence of the mother or her pre-occupation with gainful work at home meant loss of care, protection, and supervision for the children. They went to school with insufficient breakfast, their clothing was not cared for, and they suffered ill-effects mentally and physically.

3. *Employment of children*—In one-fifth of the families studied children's earnings were a source of maintenance during the father's unemployment. Factory and clerical work claimed the larger proportion of these children. Even while fathers and mothers were most desperately seeking employment some children were leaving school and securing work.

4. *Loss of savings and accumulation of debt*—Savings of a large majority of the families studied were swept away during the period of unemployment. Patiently accumulated funds for the advanced education of the children went along with the rest. Homes and other property were lost through inability to meet payment of taxes. Insurance

funds were allowed to lapse because no money was available to pay the premiums. Many of the families were heavily in debt and felt that father, mother, and children would all have to work as soon as they could find any kind of a job.

Reports compiled by the National Organization for Public Health Nursing indicate that these years of financial depression and unemployment are taking their toll in undernourishment of children. At a health center in New York City, where the percentage of undernourished children has been carefully diagnosed for 3 years, malnutrition has increased from 18 per cent to 60 per cent since 1928. Public health nurses report that their work is handicapped because parents cannot provide their children with the diet recommended. In Louisville, Ky., one agency reports a decrease of 1,000 in the number of children able to meet the health and weight standards.

The importance of stability and security in a child's life can hardly be overestimated. The Children's Charter recognized: "For every child the right to grow up in a family with an adequate standard of living and the security of a stable income as the surest safeguard against social handicaps." That this right of childhood is denied to the children of many unemployed fathers and mothers is well known. A physician has coined the expression "epidemic demoralization," to describe the sense of despair and uncertainty which descends on those who must live by the charity of others. Children share in the loss of security and feel it fully as keenly as adults. A child who discovers that his father is out of a job, that the rent is due, and that no one knows where to get money for groceries has lost that sense of protection that should surround him at all times. The personality and character of such a child may suffer permanent scars from these experiences. Even if he escapes permanent injury the child needs an unusual amount of skilled and sympathetic treatment at school. Under such conditions the school must become much more than an instructional center. It must be a steadying influence to which the child can confidently turn in time of need.

This rapid review of the forces affecting child welfare during an economic depression suggests a third responsibility of the schools growing out of the depression. The educational forces of the nation face a stirring challenge to render an increasingly effective educational service to childhood. All the evidence emphasizes the conclusion: American children need very good schools now more urgently than ever before.

## PUBLIC HEALTH NURSING\*

**The Nurse in Industry**—One of the duties of the nurse in industry is to increase the efficiency of the employees; this is what her employer, who pays her salary, expects of her. Her commonest task is to assist the physician in making his examinations, in giving first aid, and in rendering after-care to injuries which are not serious enough to put the employee off the job. The physician is guide and the nurse is responsible to him for whatever she does under his orders.

The nurse will also be required to render emergency first-aid, and she must know that dressings and the administration of drugs for minor illness are not first aid, which in its simplest terms is "usually the control of hemorrhage, protection against infection other than what has already occurred, and just simple measures as may be indicated to prevent further injury."

The nurse may not have authority to remedy unfavorable sanitary conditions in the industrial plant, but she should use what influence she has with the management if she sees inadequate toilet and washing facilities or their improper condition, improper lighting, ventilation, etc.

In many cases a nurse is employed in an industry which has no safety department. Then it is her duty to assist superintendents and foremen to prevent accidents by attention to safety devices; or if there are none, to try to waken the management to responsibilities in this matter.

The industrial nurse has a fine opportunity to be a real health educator among the employees, who are likely to be little read people, not reached by

adult health education through newspapers, magazines, etc. She can encourage them to bring their health problems to the plant physician or to her instead of going to the neighbor, corner druggist, or cult healer.

By careful example and precept she can protect the employee against accident and injury, thus serving both the employer and the employee.

The industrial nurse owes it to her profession to maintain high ethical standards, and this is not so easy when one considers that it is her job to see that the injured employee returns to work as soon as possible for the sake of the employer and yet does not return before he is able for his own sake.

She needs to be a member of her district and state nurses' association to get the advantages of professional unity. She must also keep in close touch and coöperation with the medical profession and public health profession in the community.

The nurse in industry is most useful if she remains within her own province and does not yield to pressure in prescribing or dispensing treatment for headache, indigestion, menstrual disturbances and the like, which are problems for the doctor.

Finally, it should be emphasized that the industrial nurse is, in the larger sense, a public health nurse as much as the school nurse or the health department nurse. She has a more restricted field but a peculiarly fertile field. She may reach the father of a family in which the health department can have contact only with the mother, or perhaps she reaches the mother of a family, where both parents are working, and the health department never sees any member excepting the children. She has a rich opportunity for selling the ideas of immunization against diphtheria and smallpox, for explaining the necessity of correcting physical defects in school children, and for

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDowall, State House Annex, Indianapolis, Ind.

explaining and furthering the periodic physical examination for adults. She has a magnificent opportunity to be an educator. It is for her to say whether she will use it or let it slip. If she does not elect to use it, then she need not be surprised if she fails to attain her full usefulness and becomes merely a routine swabber of iodine and swather of bandages.—

W. W. Bauer, M.D., *The Nurse in Industry*, *T. Nurse & Hosp. Rev.*, June, 1932, pp. 698-699.

**How a Public Health Nurse Can Prepare for Her Successor**—All too often a departing public health nurse does not leave her office or supplies in such a condition as to enable the nurse who follows her to take up the work with understanding and the least amount of trouble. The American Red Cross Public Health Nursing Service gives the following directions to its nurses for preparing for their successors, which ought to be useful to all public health nurses:

I. A list of where things are in the office should be made. A few of the most important things a new nurse will want to locate as soon as she arrives are:

1. Programs of work for the current year and for several years previous. (If there have been no written programs, the departing nurse would facilitate the work of the new nurse by listing her routine work and special activities and projects she would have been conducting if she had remained.) A brief statement might be attached of possible lines of growth and development for the services, *i.e.*, new projects.
2. Annual Reports
3. Monthly Reports
4. Reports of Committee Meetings
5. Special Reports
6. Location of Red Cross pamphlets, special literature, etc.
7. Location of desk equipment supplies—pens, pencils, paper, ink, etc.
8. Names and addresses of important people: Chapter chairman, Chapter secretary, nursing activities committee chairman and members of nursing activities committee, superintendent of schools, town physicians, president of the local medical society, president parent-teacher association, secretary

local Red Cross committee, chairman teachers' committee, Red Cross nursing and general field representatives, other nurses working in the community, cleaning woman, etc.

9. Home Hygiene class rolls and informational material
10. Inventory of equipment
11. Check list of Red Cross publications and see that those her successor will need are on file.
- II. A description of the filing system used should be prepared if it is not perfectly obvious. To illustrate: If the pupils' records are filed in the school and not in the central office, a new nurse might want to know where to find the pupils' cards.
- III. A month's supply of report and record forms, etc., should be on hand.
- IV. A month's supply of equipment for the nurse's bag (if this is used) should be on hand. This bag should be freshly equipped if the new nurse is coming immediately.

The most important thing, after all, is to leave directions concerning the set-up of the office so that the new nurse will be able to find things. This implies that a nurse before leaving should go over her files, reports, etc., destroying material which is obsolete, and putting what remains in order. Listing, then, will be an easy matter.

After the above has been accomplished, it would be advisable to clear with the chairman of the nursing activities committee and provide her with a copy of the information which has been prepared.—

*How the Departing Nurse Can Prepare for Her Successor*, American Red Cross, N. H. 488 (Aug.), 1931.

Mathilde S. Kuhlman—Mathilde S. Kuhlman, R.N., director of the Division of Public Health Nursing, New York State Department of Health, and one of the pioneers in public health nursing in this country, died suddenly in Albany, May 30.

She first served as tuberculosis nurse in Lockport, N. Y., then as Cortland County tuberculosis nurse. In 1918, Dr. Herman M. Biggs called upon her to assist in mobilizing nursing care in the influenza epidemic of that year. Later she was appointed state super-

visor of tuberculosis nursing, and finally in August, 1920, became director of the Division of Public Health Nursing. At this time there were 8 field nurses under her direction in New York State; at the time of her death there were 73.

Miss Kuhlman was a member of the American Nurses' Association and of the National League of Nursing Education. She was a Fellow of the American Public Health Association and a former president of the New York State Organization for Public Health Nursing.—Mathilde S. Kuhlman, *Health News*, New York State Dept. of Health, IX, 23:95 (June 6), 1932.

**The Second Grading of Nursing Schools Is in Progress**—The results of the second grading of the accredited nursing schools of the United States are coming in and are showing decided improvements over the results of the first grading 3 years ago. Seventy per cent of the 1,458 accredited schools took part in the first grading; 80 per cent of the schools are taking part in the second grading.

A few of the improvements shown in the second grading over the first are:

An increase in number of hours of theory planned for students.

An increase in amount of vacation granted students.

An increase in proportion of students having had four years of high school.

An increase in schools having a full-time instructor and also of those having two or more instructors.

There is a tendency towards doing away

with student allowances, but not an equally strong tendency toward using the money saved for the benefit of the nursing schools.—

*A. N. A. Bull.*, American Nurses' Assn., July, 1932.

**Notice to Nurses**—The undersigned Nominating Committee of the Public Health Nursing Section desires the coöperation of all of its members in canvassing the section for officers and council members for 1932. The offices to be filled are: Chairman, Vice-Chairman, Secretary, and two members of the Council. One member is to fill the vacancy made by the death of Miss Kuhlman.

Only Fellows of the Association are eligible to the Council. The Committee will be most grateful for the submission of possible nominees.

Harriet Fulmer, *Chairman*,  
4727 Ellis Ave.,  
Chicago, Ill.

Elsbeth H. Vaughan,  
Midwestern Branch,  
American Red Cross,  
1709 Washington Ave.,  
St. Louis, Mo.

Florence M. Patterson,  
Community Health Associatio  
581 Boylston St.,  
Boston, Mass.

Cora M. Templeton,  
17 City Hall,  
Cleveland, O.

Mary A. Brownell,  
140 N. 20th St.,  
Portland, Ore.

## EDUCATION AND PUBLICITY\*

*It is worth while to stop for a moment to review critically the work done and the methods employed. Such a critical review has proved necessary and fruitful in every science, for the investigator, submerged in daily routine, easily loses his judgment and is inclined to fall into a rut, uncritically employing highly developed and specialized methods in the treatment of cases which are different.—*  
Franz Alexander.

Or, in the treatment of publicity and education situations which are different—different in the varying types of mind, social conditions, occupations, and what not.

Will not vacation be all the more refreshing and stimulating if a portion of it is devoted to a critical review of "the work done and the methods employed"?

**They Will Attend the Institute—**Responses came to the first brief mention of the Health Education Institute announced in connection with the A.P.H.A. meeting in October.

Probably the fuller description in last month's *Journal* and the attractive folder will bring a full enrollment. If you failed to receive the folder please write Mrs. Willimina Rayne Walsh, American Public Health Association, 450 7th Ave., New York.

**Whatever Others Would Like to See—**Samples of any forms of health education or publicity materials of interest to other health workers are wanted for the headquarters of the Public Health Education Section at Washington in October, 1932. Send 2 or 3 copies, if available. Send copies (even

if copies have already been sent to New York) to Washington Display, Evart G. Routzahn, 130 East 22d St., New York.

**Consultation at Washington—**Individual and group consultations will be emphasized at Washington in October. What do you wish to get at Washington? What question do you wish to have answered? What would you like to talk over with several interested people? What have you to tell others? Please write to the secretary of the Public Health Education Section, Raymond S. Patterson, John Hancock Mutual Life Insurance Company, Boston.

**Cutting Costs Display—**How to get the most from the public health dollar invested in public health education and interpretation of the public health department or association will be the subject of a special display at the Washington headquarters of the Public Health Education Section. *What have you to offer? What would you like to see?*

**Exhibit of American Medical Association—**The scientific exhibit of the A. M. A. held in New Orleans, May 9-13, 1932, eclipsed in interest, in the opinion of one visitor, the rich program of papers and discussions. All of the exhibits were worthy of study and most of them were attractive eye-catchers. Considering that doctors cherish the reputation of shunning display, the showmanship evidenced was extraordinary.

Demonstration and action were aptly used. How the respirator works was shown with an actual patient in the cabinet. A clicking photo-electric cell

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

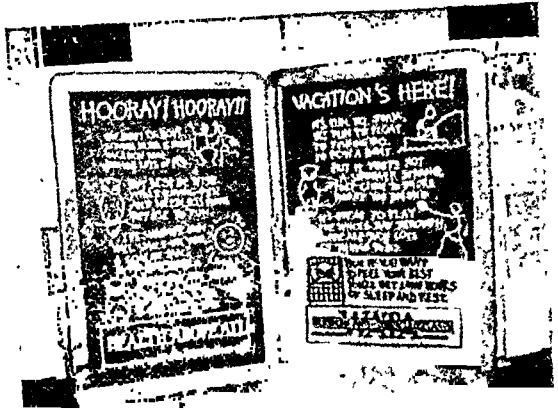
told the story of how ultra-violet rays penetrate or fail to penetrate certain glasses and fabrics, samples of which were at hand. An exhibit of a new fungoid disease of the lungs was "dressed up" with slabs of the maple trees, under the bark of which the offending fungus is found. One exhibit that required detailed study displayed a neat sign inviting the visitor to have a seat facing the display and stating that he would not be bothered by the explainer. The cancer exhibit was made up of a number of units borrowed for the purpose from a number of institutions and research workers.

The physical arrangements were a credit to the Exhibit Committee, being of uniform design, pleasing color scheme, and each bearing a sign stating what the exhibit was about and the name of the exhibitor.—H. E. Kleinschmidt, M.D.

**An Exhibit Idea for the Fair**—The Wisconsin Tuberculosis Association has attracted much attention through the use of crudely chalked messages on an old fashioned double slate. An especially timely use of it was an illustrated vacation message to put out at the time the schools closed. The text and amusing illustrations are shown in the illustration on this page.

The double slate is suitable for a window exhibit or for a permanent place in an exhibit booth. The dimensions are about 6' x 8' and the 4" wide pine frame is bound with red flannel around which colored yarn has been wound. The blackboard panels are made of wall board painted with ordinary black paint, and the writing is done with ordinary chalk. The two frames are hinged together in the center so that the exhibit folds with the writing on the inside, but since the black panels are not flush with the frame the writing does not rub together.

The slate could be used at the opening



of school in September for messages about starting the school year right. The slate idea is adaptable for many uses, for both children and adults.—M. S. R.

**What Survey Reports Say About Health Education**—Dr. Allen W. Freeman has made "A Survey of Health Organization and Service" of Ontario and Columbia Counties, N. Y. The two published reports have been issued by State Charities Aid Association, 105 E. 22d St., New York.

As to Ontario County:

Health education in Ontario County is being actively prosecuted by the school authorities and the County Tuberculosis and Health Association. The addition of a program of adult health education and a better coördination of child health education is a necessary part of the future development of public health in the county.

In Columbia County it is said that

Health education, particularly the education of adults, in the simple truths of hygiene, sanitation and disease prevention, can be attained only by continuous and prolonged effort. But little has been done in this direction up to this time, and the county health department must interest itself largely in the matter. Better coöperation with the school authorities should result also in an improvement in health teaching in the schools.

"Health Education" in the table of contents, Columbia report, refers to health education in the schools.

The opening chapter of each report,

"General Recommendations," from which the quotations came, is the most important of all. Closer reading, and easier use as a check-list of steps to be taken would be gained by the use of sub-headings, and possibly some bold face type to indicate the points made by the author.

**What Shall We Tell the Public?**—What can be said for the continued maintenance of essential services, public and private? Answers to these questions are being sought by a committee of public health workers under the chairmanship of Dr. H. E. Kleinschmidt. What can be said, and said convincingly, with supporting statistics and other data is being assembled to be made available to health agencies in all parts of the country.

This committee is one section of the Committee on Educational Materials, Mrs. Mary Swain Routzahn, chairman, representing the major groups of welfare activities. Some of the assembled material will be made available to community chests for their fall and winter money raising campaigns. Much of it will be utilized in magazine articles, some of which have been arranged for already.

**Health Education in Baltimore**—A very concise survey report gives an outline of health education:

The educational work of nonofficial agencies along the lines of their special interests has been exceedingly valuable. The same may be said of the educational work of certain industrial and insurance companies. The response which Baltimore Division of Chemistry and Food has had in its work with the dairy industry is most encouraging. The plan should be extended to other industries whose products have a direct bearing on health. The possibilities of educational work through civic, social, and professional organizations have scarcely been touched. Mothers attending infant hygiene centers appear to have a good understanding of child care but the response to the school program indicates that more intensive educational work

should be done with parents of these children. The venereal disease clinics are not used as educational centers to any great extent.—A Study of Health and Hospital Service of Baltimore, Maryland, by Joseph W. Mountin, Surg., U. S. Public Health Service, June 9, 1932.

Now that the revised edition of *Community Health Organization* is out it will be easily possible for survey reports to offer constructive suggestions and a source of further information on health education.

**If We Told All**—Just suppose that public health workers generally helped to assemble the data on "what to tell the public." What a wealth of ideas and information could be made available to all who would use the material. A case story, a factual statement, statistical data, an argument, a paragraph from a report, a book, an article—any form of material usable in "telling the public" that public health must be maintained will be welcome. Address the chairman of the Health Section of the Committee on Educational Material, Dr. H. E. Kleinschmidt, or the Section secretary, Thomas C. Edwards, National Health Council—both at 450 7th Ave., New York.

**Local Health Education Councils**—The sharing of plans and programs, and the discussion of common problems in health education were never more important than at present. Increased effectiveness at even lower costs may be expected to result from conference between local workers.

There could be an independent Health Education Committee or Council wherever 3 or 4 or more local groups are doing something in health education. Where there is a Public Health Council there might be a committee on health education which would bring together, 6 or 8 times a year, representatives of all the local groups concerned. The local Social Work Publicity Council



might well have a health education committee.

Where there is no S.W.P.C., those doing health education could join with the publicity workers in starting such a council for the joint study of many problems in technic, and then hold their separate health education sessions.

A list of topics for health education councils or committees, and plans for a social work publicity council will be supplied upon request to Social Work Publicity Council, 130 E. 22d St., New York.

Whatever the plan followed the arrangement should be simple and be free from organization red tape. A committee of 2 or 3, a mailing list, and a determination to give and get ideas and information are the essentials.

See "Your Libraries May Have the Book," in this issue for one job for such a committee or council.

**Your Libraries May Have the Books**—Almost any book remotely touching the field of this department contains information or will stimulate ideas for use in the education and publicity work of department or association. The many which are beyond the budget limit of the worker in education will usually be found in the local public or university library, or will be supplied by the state library or library commission.

The more we ask libraries for such books the more likely we will be able to get them. Whenever a book is not in the library, a letter of request or suggestion may be sent to the librarian. Others in health or social work may be enlisted to ask for the same books.

**Conservative Modernism in a Report**—Attractiveness and readability with dignity characterize the 49th annual report of New York Post-Graduate Medical School and Hospital. The modernism in typography and layout

provide distinction without gymnastics in graphic form. Photographs "bleed" over the upper and outer edges of the page, with white space near the opposite edges. Sketches, without captions, illuminate chapter endings *but never appear opposite a photograph*. The running heads at top of pages facilitate location of contents, supplementing an adequate table of contents, which is not labeled "Contents." Two pages about "Living Memorials" emphasize

. . . a growing belief among thoughtful people that memorials should be vital and emblematic of service rather than mere monuments of granite.

The end-papers express an interesting idea for making graphic the details of out-patient service, but its effect is confused by the banners for the display of the legends. Picture maps need to be extremely simple to be clear and readable.

Most of the distinctive elements in the report are adaptable to other reports, without taking over the two or three details which may seem expensive, such as the heavy cover, and the end-papers. Sample, 20 cents.

**Is This a Fair Check of Your Radio Audience?**—K. W. Grimley, Bureau of Health Education and Publicity, Jefferson County Board of Health, Birmingham, writes about "Checking The Radio Audience" in this department Feb., 1932:

An interesting article, and a ditto idea: but open to the objection of inflicting another questionnaire upon an already murmurous population; a course which I personally do not care to risk.

We have been trying to get a line on our radio audience (we present one talk per week, 10:45 A.M. Tuesdays, over WAPI, locally owned NBC affiliate) by having the announcer, after the talk has been given, conclude with the words: "copy of this lecture will be sent to anyone wishing it. Just write

or telephone your request to the Jefferson County Board of Health, Birmingham."

Over the past 3 months, during which we have presented about 12 lectures, we have received approximately 50 requests. If, as the broadcasting people claim, only a small fraction of 1 per cent ever write in for anything, we are getting a fairly good audience. If not, we're wasting about \$15 a week, as that's how much it costs in time to prepare a talk.

Of the total requests "Diabetes" drew 26 per cent; "Care Of The Teeth," and "Cancer" each 15 per cent (about cancer: "We paid good money to advertise this talk in all 3 of our daily papers"); "Diphtheria," not a single request. Mr. Grimley scored his talks as to "the actual composition and diction in comparison with each other." "Diphtheria" and two others were "bad," but several scored as "good" drew but 3 per cent each of the responses.

Was that a good check on the audience? Might the response be different if "additional information" or "answers to questions," had been offered, or "instructions as to what you should do about so and so," or the offer of a pamphlet or folder?

We hope that Birmingham will experiment with various offers and report the results.

#### RADIO

Some of the possibilities in handling topics are illustrated by the opening paragraphs from broadcasts by the Illinois State Dept. of Health:

Americans take about 3,000,000 gallons of cod liver oil a year. If one figured this out in teaspoon doses it would be like figuring the number of miles the sun is from the earth. Why do we take so much cod liver oil? The leading producer of cod liver oil is Norway, and then come Newfoundland and the United Kingdom. We take most all of the cod liver oil produced by these countries as well as come from Japan. We are the world's leaders in cod liver oil consumption.

The best time to treat a cold is to start at the time you feel chilly, when your nose begins to swell and you start sneezing. Like static in your radio or carbon on the auto cylinders,

you are out of adjustment and your involuntary controlling system is upset. Your skin is pale and cold, you feel chilly even in a warm room with an overcoat or fur wraps. The blood vessels in the skin are contracted, your temperature is below normal. The nose and eyes are red, your head feels full and you have a headache.

Man is a porous sack of water. Through his millions of perspiration glands, miles of ducts, lungs and kidneys he loses about 3 quarts of water daily. This must be immediately and continuously replaced and hence he is compelled to live near an inexhaustible supply. Since his very existence depends upon water, it thus carries equal powers of destruction to his welfare and health. Thus it is imperative that man devise means of controlling and preventing this destruction.

From Connecticut Dept. of Health come two radio dialogues, in one a layman and a public health official talk over smallpox vaccination; in the other a mother and a physician discuss the services of the laboratory to physicians. The second one has fewer technical terms. "Is the Can Opener a Cause for Divorce?" a monologue, and "Fat Mothers and Thin Children," a playlet, presented by Elizabeth C. Nickerson with the aid of staff members as Mrs. Jones, Mrs. Black, and other characters. *Frec.*

#### Health News reports:

A radio health talk on goiter, one of the series broadcast weekly by the New York State Department of Health through the courtesy of WGY, was heard over W2XAF, the short-wave experimental station of the General Electric Company, by a merchant in Playa-Ponce, Porto Rico.

The manager of an American copper plant in Chile heard over the same station, the recent talk on "How the State Department of Health Protects Your Milk Supply" and requested further information about the laboratory control of milk pasteurizing plants.

The United States minister to Bolivia, a former classmate of C. A. Holmquist, director, Division of Sanitation, wrote from La Paz that he had listened to the latter's talk on "The Sanitation of Our Surroundings—A Governmental Function" broadcast from station W2XAF on February 24.

"Broadcast to men—women reply," says *Illinois Health Messenger*:

On October 31 the regular weekly broadcast of the Illinois State Department of Public Health, given over WGN at 11:50 A.M., was directed especially to the business man. The title was, Keeping Fit for the Ten to Two Load in Business.

It proved to be particularly popular—but not among men. Eight out of each ten letters asking for copies of the address were from women. Most of them were signed with the prefix "Mrs." however.

The New York City broadcasting in the Early Diagnosis Campaign was a joint project of the New York Tuberculosis and Health Assn. and the New York Academy of Medicine. Ten stations carried 58 talks between March 23 and April 27. Nation-wide hook-ups carried 6 of the talks, with the addition of associated network stations for 6 others.

#### CUTTING COSTS

Probably we all know what pamphlets of 24 or more pages (of which 22 pages must carry some form of printing) go as 3d class at book rate of 1 cent for each 2 ounces or fractions thereof (not more than 8 ounces). Covers count as pages.

By filling out the special permit form, printed matter mailed in lots of 200 or more identical pieces (or totalling 20 pounds or more in weight) will cost 12 cents a pound (or not less than 1 cent for each piece). Pamphlets (described above) will be accepted under this bulk permit arrangement at 8 cents a pound or 1 cent minimum. Secure form at Post Office.

By filling out the permit form at the local post office, unsealed circular or form letters (printed, mimeographed or multigraphed) may be mailed in lots of 200 or more identical copies at 12 cents a pound or 1 cent minimum.

*Without a permit* unsealed circular or form letters, or other mimeographed or multigraphed material may be mailed in lots of 20 or more identical copies at 1½ cents minimum.

The following may be written by hand or typewriter on the circular or form letter: date, name of addressee, name of sender, salutation or ending such as "Dear Sir" or "Sincerely yours."

Under the permit arrangement the mail must be sorted, tied, and marked whenever more than 15 pieces go to a city or state.

*In all cases consult your local post office.* In case of any confusion or difficulty growing out of the complicated regulations, explain your problem to *Postage and The Mailbag*, 200 5th Ave., New York, enclosing 3 cent postage stamp.

Also address *Postage and The Mailbag* if you wish a summary of postal rates and regulations for 1st and 3d class mail.

A variety of valuable articles on cutting costs and on making better use of the mails is offered in the June-July, 1932, issue of *Postage and The Mailbag*. If the two articles on the use of postal cards results in but a single mailing of cards in place of something more expensive one will save many times the 25 cent cost of that issue of the magazine.

## BOOKS AND REPORTS

*The Mental Defective*—By *Richard J. Berry, M.D., F.R.C.S., F.R.S.E., and R. G. Gordon, M.D., D.S.C., F.R.C.P.E.* New York: McGraw-Hill, 1931. 225 pp. Price, \$2.50.

This volume divides itself rather distinctly into two parts. The first part, with the exception of the first chapter, has to do almost entirely with the anatomy and physiology of the central nervous system but especially the brain. Approximately 60 per cent of the book is concerned with the latter.

To the nurse or social worker interested in the practical aspects of caring for the feeble-minded, this volume offers little or nothing new. On the other hand, it contains many very interesting statements, e.g., the authors quote a study made of the inmates of an Illinois girls' reformatory where it was found that 97 per cent of these girls were feeble-minded. The reviewer wonders if the percentage of feeble-minded in any school for the feeble-minded is any higher than this. A study is also quoted which shows that two-thirds of the feeble-minded fell within the microcephalic group; another study that showed that two-thirds of the feeble-minded were below par physically; in a study made in Australia it was found that 80 per cent of 355 criminals studied were microcephalic. Another very interesting statement, which appears on page 179, is as follows:

No matter what the social standing or status of the individual, an addiction to drugs or a chronic alcoholism is, of itself, very frequently pathognomonic of mental deficiency. Again, it is not usually the drugs and the alcohol which produce the deficiency but the defect that induces the habits.

The above statements, we believe, are wholly inconsistent with the results ob-

tained from similar group studies in this country.

This book has value for the physician who is interested in obtaining a practical understanding of the anatomy and physiology of the nervous system as found in the mental defective. However, the discussions of some factors, e.g., the rôle played by the special senses in the mental life of the mental defective, in view of their practical importance, seem to be unnecessarily lengthy.

The authors of this volume have attempted to treat authoritatively, too much from a neurological point of view, a subject that is primarily, on the practical side, a psychological and social one.

The book is very well written and easily read. It consists of 8 chapters and an index and contains 225 pages. There is no bibliography.

FRANK J. O'BRIEN

*Health and Its Maintenance. A Hygiene Text for Women*—By *Bertha S. Dymont, M.D.* Stanford University, Calif.: Stanford University Press, 1931. 472 pp. Price, \$3.50.

This textbook contains as much anatomy and physiology as is considered essential in the rationalizing of instruction in hygiene. It is designed primarily for those who take a course in hygiene before physiology and anatomy have been studied.

The various systems of the body are presented in separate chapters, each one including its physiology, some of the most common diseases, and the hygiene. One chapter, "Individual Mental Hygiene," is written by Catherine Cox Miles. Another chapter, "The Girl

About to Marry," is by Mrs. Eric Allen. The last three chapters of the book are devoted to embryological development, heredity, and dieting.

The book is written in an interesting style. It is sufficiently concise to permit assimilation of its content by students. If, as the author suggests, the text material is supplemented by the use of slides, models, and demonstrations, it should prove a successful book. It would be an even more valuable text if it had included a chapter on immunity, infection, and modes of transmission of disease.

ESTHER W. STEARN

**Sanitary Law in Question and Answer—***By Charles Porter, M.D. and James Fenton, M.D. 3rd ed. London: H. K. Lewis & Co., Ltd., 1932. Price 21s.*

The fact that this book has gone through three editions is evidence of its value to those for whom it is particularly intended; namely, students in public health sanitary law. As is stated in the preface, the subject presents great difficulty, partly on account of the enormous number of laws, additions, alterations in methods, amendments, etc.

It is hard for an American to review a book of this type, as England is far ahead of us, not only in laws, but in their observance. We can say without hesitation, however, that no man in England is better fitted to deal with this subject than Dr. Charles Porter, who is a barrister-at-law as well as a Medical Officer of Health, and in this edition he is assisted also by Dr. Fenton, Medical Officer of Health of the Royal Borough of Kensington.

The book appears to cover in a clear and concise manner every question that the student can ask. Unfortunately, it is not directly adapted to American readers, except that all of us can learn much from the English, to whom we

owe the great sanitary awakening under Chadwick. The book is well printed and made up. MAZÏCK P. RAVENEL

**Control of Conception—***By Robert Latou Dickinson and Louise Stevens Bryant. Baltimore: Williams & Wilkins, 1931. 290 pp. Price, \$4.50.*

**The Practice of Contraception—***An International Symposium and Survey—Edited by Margaret Sanger and Hannah M. Stone. Baltimore: Williams & Wilkins, 1931. 316 pp. Price \$4.00.*

For many years the advocates of birth control in this country have endured slurs, insults, and imprisonment, in their bitter struggle for what they hold to be one of the most vital problems affecting the happiness of the home, and the economic welfare of future generations. There is little doubt that many persons who believe that the subject is worthy of careful consideration would have come out openly for it except that the remedies proposed in the past have not seemed adequate or properly controlled, and that the subject offends several of our important religious bodies. The matter is still in a controversial stage, but it seems much better for it to be in the hands of educated and earnest people than in those of the insincere and the charlatans. For this reason we believe that the review of these books has a place in this JOURNAL, which has up to the present time avoided the subject for the reasons given above.

As a result of these efforts, this problem is receiving widespread attention. It is discussed in the open forum of the current journals and magazines, it is debated in the highest ecclesiastical circles, and receives the thoughtful consideration of legislative bodies.

Whatever opinion one may have held of the necessity or desirability of giving the general public information for the prevention of conception, it is necessary to recognize the fact that this question

can no longer be ignored, and that the claims of its sponsors must be examined fairly and critically.

No adequate presentation of the subject, summarizing the opinions of the leaders in various countries throughout the world, and offering for critical consideration the accepted methods and the results thus far achieved, has been available until recently. It is true that several small publications have been on the market. Some of these are obviously pornographic. Others have been written entirely for the individual directly interested in preventing a possible pregnancy. However, the appearance of the two volumes, *Control of Conception* and *The Practice of Contraception*, has completely satisfied this need. These books are to be recommended without reservation to those who are interested in this important problem, whether for or against its further spread. Here will be found a frank discussion of its sociological aspects, a description of the various methods used to prevent conception, and an analysis of the results obtainable.

The *Control of Conception* is a book which should be of great value to social workers and to physicians alike. The simple straightforward language required no small amount of courage on the part of the authors. Anatomy and the physiology of fertilization are fully described and well illustrated. The known and commonly used methods for prevention are given in detail and evaluated. Operative measures for sterilization and abortion are adequately described. The last chapters are devoted to the organization and administration of birth control clinics, and a discussion of the present laws of various states and the federal government.

The *Practice of Contraception* is a complete report of the proceedings of the 7th International Birth Control Conference, Zurich, September, 1930. Reports on contraceptive methods em-

ployed were made by members for the United States, Germany, Russia, Austria, Holland, Denmark, India, China and Japan. Of particular interest is the report from Russia by Dr. Martha Ruben-Wolf.

One cannot read these books without realizing the social importance of this subject and the earnestness of its advocates. The authors have performed a much needed service and have done it well.

D. L. HARRIS

*Principles and Practices in Public Health Nursing Including Cost Analysis—Prepared by The National Organization for Public Health Nursing. New York: Macmillan, 1932. 129 pp. Price, \$1.75.*

This book is published just at a time when public health nursing agencies need guidance in showing to a scrutinizing public the relation of cost to quality of service. Therefore it is of double value. "It has been prepared especially for the guidance of executives and board members, that they may compute the cost of a visit and that they may maintain a standard of service consistent with the best public health and medical practice." It is aimed to supplement and to be used in connection with the *Manual for Public Health Nursing and The Board Members' Manual*.

The first part of the book discusses principles and accepted practices which are definitely related to cost. It discusses, among other things, personnel, salaries, health of staff, supervision, educational programs, working hours, visits, transportation and records and reports.

The reports of the Service Evaluation Committee and other special committees, the findings of time and activity studies of public health nursing organizations and reports and recommendations of the various committees of the National Organization for Public

Health Nursing which have been published at times in *Public Health Nursing*, have been drawn upon for the first part of this book. This contains the latest and best known in public health nursing procedure in brief, concise and usable form. The second part of the book deals with detailed directions for computing the cost of a visit.

While the nurse working alone might find the book helpful in computing the cost of a visit, it will not mean as much to her as to the organizations employing more nurses. To them it would be indispensable. It has been compiled with these larger organizations in mind.

The directions for computing the cost of a visit show that more work needs to be done to help those organizations who are giving a generalized service including school nursing. In their services the distinction between what is and what is not related to a nursing visit is so difficult to make that an unfair computation of cost often results.

For the organizations who are anxious to appraise themselves as to quality of service in relation to cost, for those who want to determine upon a fair charge to individuals who are able and want to pay for the service, and especially for those who have contractual agreements with other agencies for service on a cost basis, this book is a necessity.

The book is small, only 129 pages, well bound, easy to read, and well indexed. The appendix contains reports of the N.O.P.H.N. Service Evaluation Committee and the Records Committee—also suggested forms for use in calculating costs. VIRGINIA A. JONES

**Oxford Medical Adviser for the Home**—By John D. Comrie, M.D.  
New York: Oxford University Press, 1931. 391 pp. Price, \$2.25.

This volume has been prepared for use in the home. It purports to give advice of a practical character pertain-

ing to the preservation and restoration of health. Unfortunately for those who are expected to derive benefit from this source, things are included which are not of general interest, and others are not included which would enable the individual to detect early signs of disease. Although written for the laity, there is little justification for generalizations to be at variance with fact, as is so apparent in the sections on cretinism and ptomaine poisoning.

It is a nice question as to whether such books as this have a place. For people living in rural sections at great distances from medical help, they are undoubtedly of service at times. On the other hand, combined with the unscrupulous claims of patent medicine advertisers and the fact that many such medicines are sold at every crossroads store, the advice given is apt to lead many people to too much self-medication. NEWELL R. ZIEGLER.

**How to Interview**—By Walter Van Dyke Bingham and Bruce Victor Moore. Harper, 1931. 320 pp. Price, \$4.00.

The book aims to bring together from every field what it can to add to our general knowledge of how to interview, and also the peculiar technics of each field with a view to arriving at that definite plan and systematizing necessary in the interview that will yield results, and it has done so exhaustively and most admirably.

Chapters two and three are of great practical value. Chapter two is devoted to "systematizing the vocational interview." While dealing with the vocational field it is essentially a basic pattern which can be used by all interviewers regardless of their fields. The differences in details and emphasis are shown in the specific technics used in the interview for legal evidence, in journalism, in the mental clinic, in education, in social case work, in industrial

relations, and in employment—all simply and interestingly given.

Chapter three presents excellent, very practical suggestions to those "learning how to interview." The same chapter studied by those long used to interviewing could well serve as a standard for self appraisal.

Part II is concerned with "Researches in the Use of Interviews for Industrial Fact Finding." One experiment is to discover the attitudes of employees toward an employment guarantee plan, another in interviewing textile workers on strike. Both research experiments aimed to show "the proper uses, reliability, and technics of the interview process." They did show that it has its proper uses, the chief of these is "in ascertaining knowledge, not about external physical facts and events but about an interviewer's attitudes and feelings." "This is the area in which the interview as a fact-finding instrument has its greatest value." This is very fortunate because it is concerning such that "records and similar objective sources are least available."

The bibliography on the personal interview, assembled by Dr. Moore, is a comprehensive survey of the literature in English. It alone is worth the price of the book.

GRACE ROSS

**Diabetes and Its Treatment by Insulin and Diet—By Orlando H. Petty, M.D. 5th ed. Philadelphia: Davis, 1931. 224 pp. Price, \$2.00.**

In the successful handling of patients suffering from diabetes mellitus, a thorough education of the patient is a most important factor. Handbooks for the patients, written in plain and intelligible language, have become not only a desirable, but an almost indispensable part of the management of this disorder, the proper treatment of which should reduce its present inexcusably high mortality.

The 5th edition of this "Handbook

for the Patient" should be welcomed, therefore, not only by the diabetic patient, but equally by the physician who treats diabetics. It covers practically every problem of the disease and its treatment. Dr. Petty's writing is clear and concise, and can be easily understood by the layman.

The reviewer agrees with Dr. Petty as to the importance of weighing the diet, especially in severe cases. This method has its shortcomings because of impracticability; nor need it be forced upon the intelligent and coöperative patient with milder diabetes.

A very commendable chapter is that dealing with salt-free diet, the value of which is becoming well established. The Jewish patient, following orthodox dietary laws, will welcome a large number of special diet forms. The importance of close coöperation between internist and surgeon in the handling of surgical diabetic cases, has been sufficiently stressed in the preface by the late Dr. Deaver; the necessity of such team work is becoming more and more recognized. Dr. Petty's handbook serves its purpose very well in every respect.

R. SCHARF

**Tests and Measurements—By Irene Palmer. New York: Barnes, 1932. 143 pp. Price, \$2.00.**

This small volume is designed for the use of teachers and students of health and physical education. It is an attempt to interest these individuals in the possibilities of measurement and to give them a basis for evaluation and interpretation of tests.

Eight chapters are devoted to a consideration of very elementary statistics. While this information is useful to some individuals, and is of some interest, anyone who might attempt to draw conclusions with no further knowledge of statistics than this, is likely to fall into error in many instances. This and other parts of the



book are distinctly marred by the reproduction of longhand tables and calculations.

There are three chapters pertaining to public health, one of which includes Dr. Thomas D. Wood's Personal Health Standard and Scale. Other chapters are concerned with tests of motor ability, achievement, and knowledge.

The make-up and quality of paper used in the book is good.

NEWELL R. ZIEGLER

#### Principles of Health Education—By

*Clair E. Turner, Dr.P.H. Boston: Heath, 1932. 317 pp. Price, \$2.00.*

Health education in schools is one of the more recent aspects of the modern public health movement which promises much for the educator, for the health worker, and for the public. But in the words of the superintendent of the Malden, Mass., schools, who prepared the foreword to this volume:

The proper correlation of the numerous and varied health activities now existing in educational systems is a perplexing problem to everyone interested in, or responsible for, the organization and direction of school curricula.

Furthermore, until recently, a satisfactory definition of what is embodied in health education, and the methods of practical health instruction in schools, have been wanting.

Here is a manual for various groups engaged in health education work in schools which has been carefully prepared by an author eminently qualified for such a task. Years of experimenting in this field and in teaching the subject to classroom groups of school administrators, graduate students, teachers, and nurses have paved the way for the crystallization of a wide experience.

The book consists of 15 chapters dealing with the development of the school health program, the definition of and reasons for health education in schools, including underlying principles in health education, curriculum con-

struction, routine procedures, gradation of material, source material, health education in junior and senior high school, the training of teachers and supervisors, and school health administration.

The reliability and use of growth measurements are also discussed. Principles and procedures are set forth which have been found practical and useful, with special reference to the Malden schools. The book is timely, interestingly written, and well printed.

IRA V. HISCOCK

*Rural School Nursing—The American Red Cross, Washington, D. C. 152 pp. Price, \$.50.*

The third revised edition of *Rural School Nursing* is, as formerly, designed for the nurse working alone in a community, usually in a large county where school nursing is only one phase of the public health nursing program, where there is no medical inspector and where there are several thousand pupils to one nurse.

Emphasis is placed on the joint and separate responsibilities of the teacher and the school nurse for the health of the rural child.

This little book was greatly needed among rural school nurses to bring them up to date on some of their practices. It makes a fine supplement for Mary Ella Chayer's *School Nursing*, recently published, which gives the underlying philosophy of all school nursing.

EVA F. MACDOUGALL

*Medical Administration of Teaching Hospitals—By Emmet B. Bay, M.D. Chicago: University of Chicago Press, 1931. 136 pp. Price, \$2.00.*

This book concerns itself with the medical aspects of administration in teaching hospitals, and presents the findings of a comparative study of 19 important teaching institutions in this field.

The foreword, by Michael M. Davis,

not only emphasizes the great need for adequate organization because of the complexity of modern medicine, but stresses the effect of over-specialization upon general efficiency in the field of medicine. Davis emphasizes the outstanding value of Bay's analysis in furnishing the impetus for the promotion of other comparative studies of important hospital functions. Attention is focused, too, upon the period of evolution and experimentation through which medical schools and affiliated hospitals are now passing.

The following are some of the more specific problems presented and discussed: (1) Admission of patients, (2) Keeping of medical records, (3) Relation of the Outpatient Department to the hospital, (4) Administrative duties of the Chief of the Medical Service and of the Resident Physician.

Bay lists a series of very necessary functions and endeavors to show the

methods employed in the performance of the same in the 19 institutions studied. Interesting deductions are presented to the reader who cannot but become acutely aware of the many problems confronting medical administration.

In addition to a brief descriptive summary of the 19 institutions included in the study, the author also presents a chart used for the analysis of administrative functions and outlines particularly the problems existing today and what appears to be the probable solution of them.

The data assembled furnish a well defined set of findings and set up a technic for the study of medical administration for teaching hospitals. Very effective methods for the administration of this type of hospital are presented and the book, as a whole, proves very interesting and readable.

CHARLES F. WILINSKY

## BOOKS RECEIVED

ACCIDENTS, NEUROSES AND COMPENSATION.

By James H. Huddleson and J. Ramsay Hunt. Baltimore: Williams & Wilkins, 1932. 256 pp. Price, \$4.00.

THE CHEMISTRY OF TUBERCULOSIS. 2d ed.

By H. Gideon Wells and Esmond R. Long. Baltimore: Williams & Wilkins, 1932. 481 pp. Price, \$7.00.

HYGIENE. A Textbook for College Students.

2d ed. By Florence L. Meredith. Philadelphia: Blakiston, 1932. 802 pp. Price, \$3.50.

THE SOCIAL AND ETHICAL SIGNIFICANCE OF

NURSING. By Annie W. Goodrich. New York: Macmillan. 401 pp. Price, \$3.00.

THE SCIENCES OF MAN IN THE MAKING. An

Orientation Book. By Edwin A. Kirkpatrick. New York: Harcourt Brace, 1932. 396 pp. Price, \$4.00.

HYGIENE OF COMMUNITY, SCHOOL, AND HOME.

By Ernest W. Steel and Ella G. White. New York: Harper, 1932. 368 pp. Price, \$2.25.

FUNDAMENTALS IN MASSAGE. By Kathryn L.

Jensen. New York: Macmillan, 1932. 167 pp. Price, \$2.00.

TOWARDS NATIONAL HEALTH, OR HEALTH AND HYGIENE IN ENGLAND FROM ROMAN TO VIC-

torian Times. By J. Anthony Delmege. New York: Macmillan, 1932. 234 pp. Price, \$6.00.

Medicine and the State. The Relation Between the Private and Official Practice of Medicine with special reference to Public Health. By Sir Arthur Newsholme. Baltimore: Williams & Wilkins, 1932. 300 pp. Price, \$3.50.

Proceedings of the Ninth Annual Short School Texas Public Health Association. November 9-14, 1931. Austin: Texas Public Health Association, 1932. 84 pp. Price, \$50.

LEAGUE OF NATIONS. QUARTERLY BULLETIN OF THE HEALTH ORGANIZATION. Vol. I, No. 1. Boston: World Peace Foundation, 1932. Price, \$50. Yearly subscription \$2.00.

THE CRITICISM AND IMPROVEMENT OF DIETS. Ministry of Health: Advisory Committee on Nutrition. 1932. 14 pp. Price, \$10.

Health and Home Nursing. By George Margaretta Douglas. New York: Putnam, 1932. 383 pp. Price, \$2.50.

HOUSE DESIGN, CONSTRUCTION AND EQUIPMENT. The President's Conference on Home Building and Home Ownership. Washington, D. C., 1932. 325 pp. Price, \$1.15.

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Milk Supply Supervision**—This discussion of modern milk sampling practice indicates how vastly more complicated are the milk supply control problems of the great urban centers than are those of the typical small city.

BREW, J. D. Locating the Causes of High Bacteria Counts in Milk. *Municipal Sanitation*, 3, 6:238 (June), 1932.

**Another Venereal Disease Survey**—New Orleans was found, in the survey reported upon, to have a venereal disease incidence lower than that of other cities. But as the proportion of cases treated illegally by others than physicians was found unusually high, the showing will not be viewed with undue pride by the sanitary authorities of the city.

CLARK, T. and USILTON, L. J. Prevalence of Venereal Disease in New Orleans, La. *Pub. Health Rep.* 47, 22:1187 (May), 1932.

**Scarlet Fever Isolation**—The clinical aphorism that a disease with many remedies has none, applies aptly in criticism of present-day control measures for scarlet fever, say these authors who have summarized the seemingly hopeless variety of isolation and quarantine requirements. A logical basis for reasonable regulations is discussed.

DARLING, G. B. and GORDON, J. E. American Administrative Practice in the Control of Scarlet Fever. *J. Prev. Med.* 5, 3:185 (May), 1932.

**Private Practice and Health**—The editor of the *J. A. M. A.* tells whither the private practice of medicine is drifting. Everyone should read this paper not only for what is said but the way in which it is written. Would that other writers in the field of public health could take a leaf from this effort.

FISHBEIN, M. Present-Day Trends of Private

Practice in the United States. *J. A. M. A.* 93, 24:2039 (June 11), 1932.

**Cancer Cures**—So little evidence of cancer cures is ever published that this summary of the experience in the Massachusetts Cancer Clinics is welcome. Such evidence is needed to combat the prevailing attitude toward cancer. As the author says: "When a patient dies of cancer every one knows it; when a patient is cured of cancer few know it and none like to admit it."

GRAVES, W. P. Summary of Cured Cancer Clinics. *New Eng. J. Med.* 206, 25:1302 (June 23), 1932.

**Cod Liver Oil and Milk**—A small group of underweight employed young women were given cod liver oil and milk in addition to their home diets. They gained an average of 2.6 pounds, were absent 195 hours less than during a previous period, and improved their efficiency.

HOLMES, A. D. *et al.* Results of Supplementing the Dietary of Substandard Workers With Cod Liver Oil and Milk. *J. Indust. Hyg.* 14, 6:207 (June), 1932.

**Human Intestinal Parasites**—A state-wide survey in which the feces of 32,000 persons were examined revealed that hookworm infestation had been so reduced in incidence that only in restricted localities in Tennessee was it a menace, but that other intestinal parasites had not been affected. The sanitary and hygienic problems involved are discussed.

KELLER, A. E. *et al.* A State-Wide Study of the Human Intestinal Helminths in Tennessee. *J. Prev. Med.* 5, 3:161 (May), 1932.

**All About Vitamin A**—The story of the research leading to the detection

of vitamin A, the characteristics and pathology of avitaminosis, the assaying and chemistry of the vitamin and its functions, are all included in an excellent summary of this broad subject. The paper is the first of a series on vitamins, all of which should be of great interest to health workers.

MENDEL, L. B. Vitamin A. *J. A. M. A.* 98, 23:1981 (June 4), 1932.

**Abortive Poliomyelitis**—Epidemiologic study of poliomyelitis outbreaks indicates that, accompanying frank cases, there occur many cases of illnesses not unlike incipient poliomyelitis. These minor illnesses occur among contacts more frequently than is commonly supposed, the ratio to orthodox cases being 6 to 1.

PAUL, J. R. *et al.* "Abortive" Poliomyelitis. *J. A. M. A.* 98, 26:2262 (June 25), 1932.

**Educational Opportunities in Dental Clinics**—Small units with affiliated nutritional and educational workers produce very practical returns in health, if the experience in New York

City is typical. A valuable contribution.

SINKS, A. E. Dental Clinics and Education. *Child H. Bull.* 8, 3:81 (May), 1932.

**Health Education Abroad**—Thus concludes a most stimulating discussion on health education problems: "Propaganda is now a legitimate department of preventive medicine. It tries to meet the profound and sometimes pathetic anxiety for a knowledge of health, and by its inadequacy it produces a sad state of enthusiasm." Could a happier phrase than "sad enthusiasm" be chosen to describe the plight of the usual victim of our efforts to educate?

WILLIAMS, J. H. H. Creative Health Propaganda. *J. State Med.* 45, 9:271 (June), 1932.

**A Story of Smallpox**—An illuminating history of smallpox and vaccination in Massachusetts providing valuable statistical references and entertaining excerpts from early writings on the subject. Altogether a most useful source of material for the vaccination propagandist.

WOODWARD, S. B. The Story of Smallpox in Massachusetts. *New Eng. J. Med.* 206, 23:1181 (June 9), 1932.

## NEWS FROM THE FIELD

### U.S.P.H.S. NEW BUILDING

ON May 7 the cornerstone of the new office building for the U. S. Public Health Service in Washington, D. C., was laid by the Secretary of the Treasury. The ceremony was attended by the Assistant Secretary having supervision of the Public Health Service, Surgeon General H. S. Cumming, and a group of other persons interested in the Service.

### ISOLATING DISTEMPER GERM

IN an effort to isolate the distemper germ and to find a serum, experiments are now being carried on in the Welcome Research Laboratories in London. Fifty silver foxes have been shipped to London for experimental purposes by the Canadian National Express, the animals having been selected from the ranches in the vicinity of Moncton, New Brunswick.

### INDIANA CHILD HEALTH INSTITUTE

THE annual Child Health Institute, arranged by the Indiana State Board of Health, was held at the Winona Lake Chautauqua, July 4-9. It was devoted to home protection and to the conservation of the child by the home in coöperation with the community and organized lay groups and professional and official agencies. The specific topics emphasized were: Safety, Sports, Better Homes, Nutrition, The Handicapped Child, Medical Service, Probation Problems.

### PARENT-TEACHER PLANS

PLANS of work and policies for the more than 20,000 parent-teacher associations, units of the National Congress of Parents and Teachers, will

be considered at the meeting of the Parent-Teacher Board of Managers to be held from September 26 to October 1 at the Edgewater Beach Hotel, Chicago.

### WILLIAM WOOD AND WILLIAMS & WILKINS MERGE

THE Williams and Wilkins Company, of Baltimore, on June 16, purchased inventory assets and good will of William Wood and Company, well known as one of the oldest American publishers of medical text books and importers of English medical books, established in 1804 by Samuel Wood. The firm name will be perpetuated, and business will continue for the time being at 156 Fifth Avenue, New York. The Williams and Wilkins Company has always specialized in various research publications, including medical works.

## PERSONALS

DR. GREENE L. REA, member A.P.H.A., has been appointed acting Health Officer of Charlotte, N. C., succeeding Dr. Wilbur A. McPhaul, member A.P.H.A., who recently resigned to become Health Officer of Pensacola, Fla.

DR. JOHN R. TARRANT has been appointed Health Officer of Portland, Conn., succeeding Dr. Donald J. MacGillivray.

DR. THEODORE F. FOSTER has been appointed Health Officer of West Hartford, Conn.

DR. JAMES J. CHARRON has been appointed Health Officer of Putnam, Conn.

DR. WILLIAM J. FRENCH, of New York, has been appointed full-time Health

Officer of Howard County, with headquarters at Ellicott City, Md., and Dr. Robert H. Johnson, of Brookhaven, Miss., is the New Health Officer of Somerset County, with headquarters at Princess Bay, Md. Dr. French, member A.P.H.A., was Director of the Child Welfare Commission of Delaware and the Fargo Child Health Demonstration of the Commonwealth Fund. Dr. Johnson has been director of the Lincoln County Department of Health co-operating with the Mississippi State Board of Health.

DR. G. KOEHLER, member A.P.H.A., for 20 years Assistant Commissioner of Health of Chicago, and for the past year with the Illinois State Department of Public Health, was recently appointed Director of Health and Hygiene in the Springfield, Ill., schools.

DR. JOHN H. GOODNOUGH, of Rock Springs, Wyo., was recently elected President of the Wyoming Association of County Health Officers.

DR. LEMO T. DENNIS, of Rochester, N. Y., has been appointed field worker in child development and parental education of the American Home Economics Association, of Washington, D. C. She succeeds Dr. Esther McGinnis, who returns to her work as associate professor at the Institute of Child Welfare, University of Minnesota.

DR. CHARLES L. TEGTMEIER, of Freeburg, Ill., has been appointed District Health Officer, succeeding his brother, the late Dr. Edward H. Tegtmeier, of Millstadt. Dr. Tegtmeier has practised in Freeburg for 24 years. He served as Mayor of the city for 3 terms, and was village Health Officer for 15 years. He will have charge of state health activities in the Counties of St. Clair, Madison, Monroe, Clinton, Washington, Randolph and Perry.

LAWRENCE G. SYKES, M.D., formerly Medical Director of the Connecticut General Life Insurance Company, has been appointed Medical Director of the Life Extension Institute, the position formerly held by the late Dr. Eugene Lyman Fisk.

#### DEATH

DR. WILLIAM WILLIAMS KEEN, distinguished surgeon of Philadelphia, Pa., since 1889 Professor and Emeritus Professor in the Jefferson Medical College, died on June 7, at the age of 95 years.

#### CONFERENCES

August 11, Fourth Annual (one day) Course of Study in Cancer, Commission on Cancer of the Medical Society of the State of Pennsylvania, Lewistown, Pa.

August 12-18, Los Angeles County Public Health Exposition, Los Angeles, Calif.

September, Ninth Congress of the International Society for the History of Medicine, Bucharest, Rumania.

September 6-9, International Union Against Tuberculosis, The Hague.

September 12-19, American Hospital Association, Detroit, Mich.

September 26-October 1, National Congress of Parents and Teachers National Board of Managers, Chicago, Ill.

October, 1932, Health Committee of the League of Nations, Geneva.

October 3-7, Twenty-first Annual Safety Congress and Exposition, Washington, D. C.

October 22-24, Conference of State Sanitary Engineers, Washington, D. C.

October 24-27, 61st Annual Meeting, American Public Health Association, Washington, D. C.

November 14-18, Tenth Annual Short School, Texas Public Health Association, Dallas, Tex.

# American Journal of Public Health and THE NATION'S HEALTH

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## Recent Advances in Fumigation of Ships

C. L. WILLIAMS

*Senior Surgeon, U. S. Public Health Service, Rosebank, Staten Island, N. Y.*

THE problem of rat eradication on ships has been intensively studied in this country principally by Creel and Simpson,<sup>1</sup> Grubbs and Holsendorf,<sup>2</sup> Akin and Sherrard,<sup>3</sup> and Williams.<sup>4</sup> During the past 3 years, the whole subject has been under review by a commission of the League of Nations coöperating with the Office Internationale d'Hygiène Publique. As a part of their program, systematic studies of fumigation and directly related procedures were carried out at the New York Quarantine Station. These studies form the basis for the present paper.

From data available at the beginning of this study, it was apparent that: (1) only about 10 per cent of ships were persistently and heavily rat-infested, the other 90 per cent exhibiting variable infestation or complete freedom from rats, and (2) that infestation was largely dependent on the extent and depth of rat harborages, maintenance of large colonies being due principally to breeding on board.

These conclusions pointed the way to two distinct lines for investigation. One pursued by Akin and Sherrard<sup>5</sup> was the possibility of segregating ships according to degree of rat infestation, the other to develop more effective fumigation methods for treatment of infested ships. The latter study has taken much time and physical labor. It has involved an intimate and extended study of the details of ship construction, as well as the development of improved methods of introducing fumigating gases.

The fumigants in general use on ships today are hydrocyanic acid and sulphur dioxide. The modern cyanide fumigants are liquid

HCN and Zyklon. The possibilities of sulphur dioxide have not yet been fully investigated and it will be only incidentally referred to in this paper.

Liquid HCN is packed in heavy steel cylinders, from which, for fumigation purposes, it is sprayed by air pressure. The liquid is the most effective and adaptable form of HCN, but requires the most apparatus. It is also the most dangerous to handle.

Zyklon and Zyklon discoids are liquid HCN absorbed in inert material—kieselguhr and wood fiber discs respectively. It is packed in heavy metal cans and used by spraying on the floor.

#### PENETRATION OF GASES

The first step was to discover, by extensive opening and tearing out of harborages *after* fumigation, the locations wherein rats escaped the gas. A number of specific instances are cited in a recent *Public Health Report*.<sup>5</sup> The net conclusion was that lack of penetration, particularly into dead air spaces, was the principal cause of failure.

Molecular diffusion of gases is a relatively slow process and probably is only a minor factor in the dissemination of fumigant gases. Apparently, this is principally accounted for by convection and by dynamic forces, mainly wind pressure.

When a rat is placed in a small box carefully sealed except for a single  $\frac{1}{4}$ " hole, it will pass through a 2-hour exposure to the standard amount of HCN without apparent effect. If one additional  $\frac{1}{4}$ " hole is made in the box, a similar exposure will kill the rat. The difference is due to the establishment of an air current.

Rat harborages with only one opening are quite common on ships, those usually most difficult to treat being spaces under floors in the holds and burrows into cold storage insulation. In the latter instance, even injection of the fumigant by compressed air often fails to project it to sufficient depths.

#### ABSORPTION

It has been shown that bulk materials, particularly when moist, rapidly absorb both HCN and  $\text{SO}_2$ , but even flat surfaces take up appreciable amounts of gas, the amount increasing as roughness or porosity of the surface increases. The amount of moisture present seems to be most important, though temperature also has a distinct effect.

Absorption influences fumigation by removing gas from the air and thereby reducing the concentration. Within small enclosed spaces where the absorptive surfaces are extensive, in relation to the volume of enclosed air, the gas may never reach a lethal concentration.



In cold storage insulation, the highly porous insulating material absorbs so much gas as to make this a major factor in preventing effective fumigation even by direct injection. In loaded ships, the cargo appears to absorb very considerable amounts of the gas, so much that no allowance in dosage should be made for space occupied by cargo.

#### HCN CONCENTRATION

There being very little data available as to the amount of gas actually in the air of fumigated spaces, one of the first steps was to develop a simple colorimetric method of determining HCN concentrations. A large number of tests has disclosed that the theoretical maximum concentration is rarely reached and that during exposures there occurs a steady reduction of concentration, very largely dependent on atmospheric disturbance as well as absorption.

Inside of rat harborages, concentration was found to vary greatly. In some it would be as high as in the hold; in others it would be zero. Nor was it always possible to predict, even approximately, what would occur. Entirely enclosed spaces, if no cracks presented, were usually impervious, while the presence of many cracks generally admitted plenty of gas. In dead ends gas was usually sub-lethal, under floors sometimes entirely absent.

#### TOXICITY FOR RATS

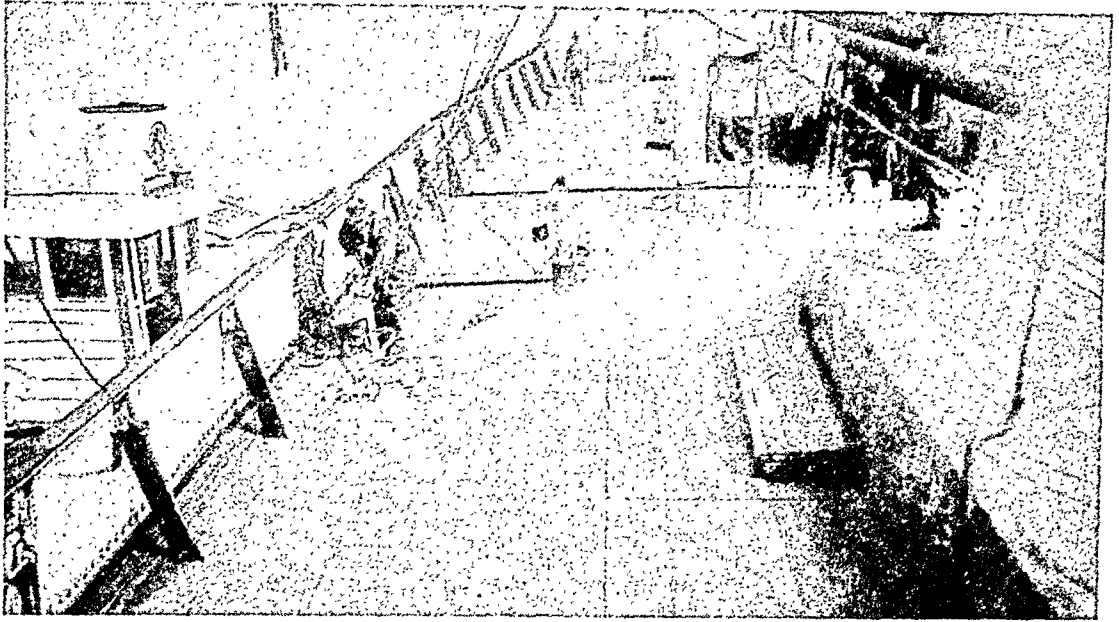
To appreciate the influence of concentration, it is necessary to know the lethal time relationship. Akin and Sherrard,<sup>3</sup> Barcroft,<sup>8</sup> and the writer have found that 1/8 to 1/5 oz. liquid HCN per 1,000 cu. ft. will kill exposed rats in 30 minutes.

It will be seen from this that in a standard fumigation (2 oz. HCN per 1,000 cu. ft.—exposure 2 hours), the dose represents a theoretical concentration of 10 times, and the exposure one that is 4 times the lethal minimum. While in most cases both the amount and the time are more than required, where deep harborage is present even these margins may be insufficient.

#### RAT HARBORAGES

On ships, rat harborages are of four general types: open, partly enclosed, completely enclosed, and burrows. Nests in the open usually indicate a scarcity or overcrowding of better harborages.

From the viewpoint of the fumigator, harborage is (1) pervious, (2) capable of being opened to insure penetration, and (3) impervious and inaccessible. The last named covers any impervious harborage that cannot be opened without costly damage, or that cannot be reached.



The air jet hydrocyanic acid sprayer

Cold storage and similar insulation was found to present the greatest problem. The insulating material is always a soft substance into which rats burrow long distances. Merely removing portions of the retaining sheathing is of no manner of use; it is essential to open each burrow. In badly infested areas this is tantamount to complete removal of the insulation.

#### DIRECT INJECTION OF FUMIGANTS

Confronted with the knowledge that the fumigating gas failed to penetrate into many harborages and that a large proportion of these could not justifiably be opened except in the presence of reasonable evidence of plague infection, three lines of procedure were considered and, to a greater or less extent, investigated: to increase the amount of gas, to increase the time of exposure, and to inject the fumigant directly into harborages.

Neither increasing the amount of fumigant nor the time of exposure was desirable. Both increased the cost directly; one also increased the time required. Both were bound up with the problem of maintaining concentration. They are still under investigation. It may be stated now, however, that increasing the exposure from 2 to 3 hours produced a distinct increase in the effectiveness of the fumigations.

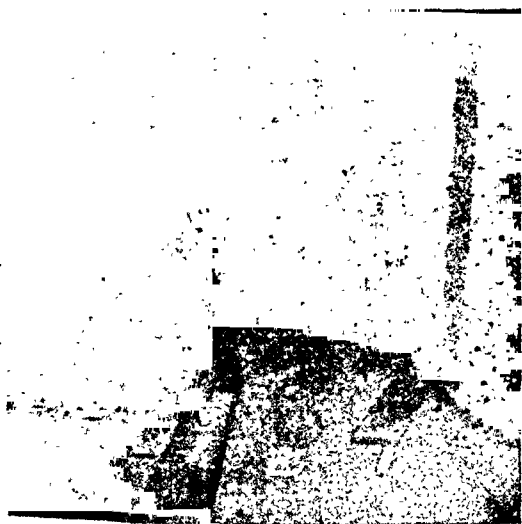
The third procedure—direct injection of the fumigant—was promising and has been studied at some length. The first projection apparatus used was a converted vacuum cleaner which was fed Zyklon. It was effective but clumsy. The next plan was to force

air through a can of Zyklon and lead it to points of application through a long rubber hose. This method is reasonably effective but has the disadvantage that dosage is inaccurate; at first, the air becomes heavily laden with HCN, but as evaporation proceeds the Zyklon is chilled until finally very little HCN is taken up.

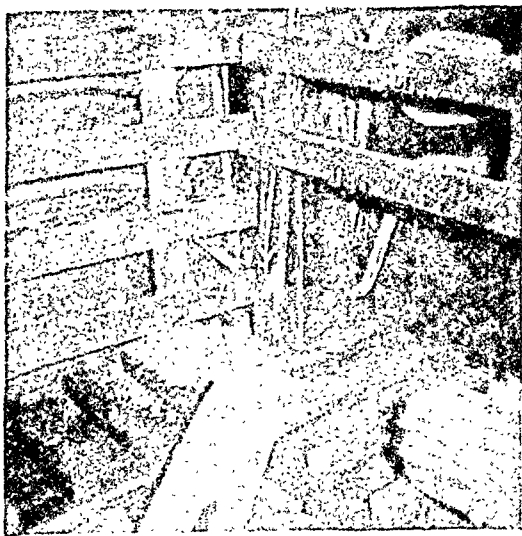
The inaccuracy of the Zyklon method led to the use of liquid HCN, which, while more troublesome and dangerous to handle than Zyklon, is far more adaptable. First efforts were confined to direct spraying within harborages. For this purpose was used a trigger valve controlled sprayer at the end of a supply tube. The apparatus was much improved by replacing the cylinder of liquid with a strong glass bottle which was carried slung from the shoulder. Pressure was supplied in this bottle by screwing down a steel capsule of highly compressed  $\text{CO}_2$  onto a hollow pointed needle, which led into the bottle through a check valve.

#### THE AIR JET SPRAYER

This apparatus, while superior to the Zyklon pump, had the disadvantage that the liquid could not be projected very far, spraying only the immediate vicinity of the nozzle. The next step was to mount air tanks and a compressor on the fumigating boat (similar apparatus may be mounted on a light truck), and to construct an air jet projector. As now in use, this is an oxy-acetylene torch with the liquid HCN, under pressure, attached to the acetylene side and air pressure to the oxygen side, both supplies being controlled by spring valves



Injecting HCN under raised flooring



Rat burrow into cold storage insulation, chalk-marked for direct fumigation. Note loose cork that the rats have pulled out through the opening directly below the cross mark.

operated by a single handle. Experience has shown the best spray is thrown with 100 lb. pressure on each line. A nozzle operated on the atomizer principle throws an equally good spray and can be operated with much less pressure on the liquid line—about 30 lb. In the open, the visible spray is projected about 8 to 10 feet, the invisible vapor much further. This apparatus is an extremely effective fumigating instrument. It, however, has its disadvantages—two of them. One is that it may be too effective, that is, the relatively very large amount of fumigant introduced into a closed space may become a later hazard by failing to dissipate after the fumigation; being inaccessible to the fumigators, they cannot determine the concentration before leaving. The other is that the hose line, full of liquid HCN under high pressure, is a hazard to the fumigator handling the apparatus.

To overcome these disadvantages a return was made to the method of passing air through the fumigant, this time, however, through 18 to 30 lb. of liquid HCN instead of 5 lb. (gross weight) of Zyklon. This has worked well. The lesser surface prevents too rapid evaporation and the greater mass prevents too rapid chilling. Only one hose line goes to the projector, this carrying air laden with HCN vapor, the latter in far smaller amount than is projected by the spray, but quite sufficient for the purpose in hand. Should the line break, the fumigator is sprayed with air, containing HCN vapor it is true, but a very different proposition to a stream of liquid HCN. It is presumed that it is of course realized that when using any of these direct injection apparatuses, the operators wear gas masks.

The air jet sprayer was developed to project the fumigant directly into enclosed spaces. It was at once adapted, however, for general spraying of liquid HCN into holds. In this form it is operated from the deck. The nozzle, being horizontal, shoots the gas toward the sides, while the back pressure causes the nozzle, hanging free at the end of the supply tubes, to fly around in all directions. The result is a thorough distribution, at once, of the gas to all parts of the hold.

#### PRELIMINARY INSPECTION

All fumigation study, but particularly the development of direct injection apparatus, has more and more emphasized that a preliminary inspection of the ship, as the first step after the fumigating crew comes aboard, is an absolute essential of adequate and effective fumigation. While on the majority of vessels there will be found no harborages requiring direct injection, when they do exist they must be located and marked beforehand. It is too difficult to search them out while wearing a gas mask and carrying an injection apparatus.

On most infested ships, there will be some harborages which will protect rats if undisturbed, but which can be readily opened to admit sufficient gas when detected during preliminary inspection.

#### RAT-PROOFING

Rat-proofing requires here some mention, but cannot be entered into at any length. It is, however, inextricably bound up with fumigation.

As has been stated, rats sometimes escape fumigation in one or two deep harborages, remaining as a nucleus from which the colony is rebuilt. When these few harborages are eliminated, subsequent fumigation kills all the rats on board and the persistent colony disappears. Such selective rat-proofing has been extremely useful in many cases.

#### FUMIGATING LOADED SHIPS

In essentials, a loaded vessel presents to the fumigators a ship in which has been placed a relatively enormous, though temporary, rat haborage and one in which the permanent harborage in the holds is covered.

A study of cargoes has shown that they may broadly be divided into package or lump cargo, fine bulk, and bulk liquid. Bulk liquid is in itself dependably rat eradivative and may be passed out of the picture. Finely divided bulk packs into a relatively solid mass, into which gas penetrates but a short distance; fortunately, the same applies to rats. Its worst feature is that it rather completely covers up the permanent harborages.

Package or lump cargo presents numerous interstices into which rats readily penetrate. It has been found, however, that HCN gas will generally reach the rat through any opening through which the rat itself can pass. Dead ends appear to be relatively infrequent, so that the cargo itself is a rather poor protection to rats.

Cargo never fills the holds completely. Always there is a space between it and the deck above, throughout which the gas disseminates. In the case of package or large lump cargo, there are also spaces at the sides and usually along the faces of bulkheads, which permit the flow of gas down the sides as well as over the top, and provide a route for air currents passing through the cargo.

Into the lower levels of loaded holds gas must be introduced by way of the ventilators. When Zyklon is used, the dosage on different levels is inexact. When liquid HCN is used, the delivery tube is guided into each level in turn and exact doses are introduced. Rats under the floors cannot be reached by gas in the holds, but may be

reached through the sounding pipes into the bilges. To date, it has not been thought justifiable to introduce a full dose of HCN via this route, but it is believed possible to accomplish bilge fumigation with a motor-driven blower.

Ventilation of loaded ships has not appeared as a material problem. Accessible portions of holds have been found to clear in about the same time that empty holds will clear, while the inaccessible portions are found clear by the time they are reached in the process of unloading. The exceptions to this general rule have appeared only when the ship's crew closed the hatches *and ventilators* after the departure of the fumigating crew.

To prevent accidents, however, the only reasonable course to pursue after a loaded fumigation is to leave a fumigator as a guard during unloading operations, until he is convinced that gas has disappeared from all parts of the holds. Guards may be kept on rat-infested vessels to collect rats uncovered in and under cargo.

In general, a loaded fumigation carefully performed may be counted on to kill 80 per cent of the rats on a ship. The exceptions that have been noted have appeared mostly on ships in which empty fumigations failed of this degree of effectiveness and on vessels harboring rats under floors in holds.

#### RAT INFESTATION INSPECTION

No dissertation on improved fumigation methods is complete without at least a few words on infestation inspection. The origin of this procedure in this country was undoubtedly the observation that fumigators were able to predict, at least approximately, the rat yield.

Through careful studies of Akin and Sherrard, since amply confirmed,<sup>7</sup> the signs of infestation—rat droppings, rat runs, rat tracks, and cutting or gnawing—have been classified and evaluated, so that today an inspector can determine, with remarkable accuracy, in a relatively short time, the number of rats on a ship, their location and, in some degree, how long they have been present. The procedure has become of tremendous value in eliminating fumigations of ships already free of rats. It is one of the essential bases of the international quarantine agreement now in effect.

#### TEST PAPERS

An extremely useful and practical chemical test for HCN concentration has been developed by Sherrard.<sup>9</sup> It consists of dried strips of filter paper impregnated with mercuric chloride, methyl orange, and glycerine in definite proportions. When one of these is dropped into

a hold, it will turn a distinct pink color, readily discernible from the deck, in the presence of HCN. If the color change is not distinct in 2 minutes, the hold may be safely entered by fumigators. The test is quite as reliable as test animals and simpler in every way to use, with the single restriction that the papers after turning pink tend to bleach, even in the continued presence of HCN, so that additional papers must be used for further tests.

### FUMIGATION RESULTS

Improvement in fumigation methods should be measured by improvement in results. The measures described herein have been developed, tested, and put into use at the New York Quarantine Station during the past 6 years, the essential figures over which period appear below.

	1925	1926	1927	1928	1929	1930	1931
Rats per infested ship.....	18.1	22.1	22.0	21.1	21.8	18.0	15.2
Rat-infested ships—per cent of all ships referred to the Fumigation Division.....	49.1	42.3	30.9	23.0	31.5	24.6	16.0

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# Ages of Health Officers in Relation to Professional Training

JOHN A. FERRELL, M.D., DR.P.H., F.A.P.H.A., AND PAULINE A. MEAD

*Rockefeller Foundation, New York, N. Y.*

ALTHOUGH the age of a health officer is important for several reasons, the present discussion will be confined primarily to its influence on his taking university training in public health. The young physician who has been graduated at a grade A medical school within the past 10 years, as a rule is well grounded academically and medically. He is able to meet university admission requirements and to carry successfully its courses in public health. In view of his remaining years of usefulness, his investment of time and money in public health training should yield a real return.

So much cannot be said for older physicians. Those who were graduated a score of years ago, for example, as a rule are not well grounded in the basic sciences and cannot satisfactorily take most of the university courses in public health. Moreover, there would be less incentive for them to invest time and money in courses of training when their expectancy for vigorous health would be for a comparatively brief period. Experience has shown that physicians not over 35 years of age are most satisfactory as students of public health, but exceptional men up to the age of 40 do reasonably well. While occasionally men above this age may carry courses successfully, in general they find the work difficult and at times embarrassing.

The physician who has grown old while serving as a full-time health officer has had opportunity to acquire a great deal of useful knowledge and practical experience, and even though he may be lacking in certain technical subjects, he may play a very useful rôle in administrative and routine health measures. Until schools of public

TABLE I  
CLASSIFICATION BY AGE GROUPS OF STATE AND PROVINCIAL HEALTH OFFICERS, 1932

	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74
48 State Health Officers.....		5	4	8	14	11	4	2
9 Provincial Health Officers.	1	1	1	3	1	1	1	



TABLE II

FULL-TIME COUNTY HEALTH OFFICERS GROUPED ACCORDING TO AGE, 1932

*United States*

States	Total Number	Average Age	Number				Percentage			
			Under 35	35-40	41-50	Over 50	Under 35	35-40	41-50	Over 50
Alabama	52	45	15	4	11	22	28.8	7.7	21.2	42.3
Arizona	4	57				4				100.0
Arkansas	27	52	3		9	15	11.1		33.3	55.6
California	14	51		2	4	8		14.3	28.6	57.1
Colorado	1	51				1				100.0
Delaware	3	47	1			2	33.3			66.7
Florida	2	42	1		1		50.0		50.0	
Georgia	31	50	4	2	12	13	12.9	6.5	38.7	41.9
Idaho	1	29	1				100.0			
Iowa	3	54			1	2			33.3	66.7
Kansas	10	58			1	9			10.0	90.0
Kentucky	70	46	21	6	10	33	30.0	8.6	14.3	47.1
Louisiana	32	47	5	4	13	10	15.6	12.5	40.6	31.3
Maryland	17	44	1	7	4	5	5.9	41.2	23.5	29.4
Massachusetts	3	40	2			1	66.7			33.3
Michigan	13	42	3	4	3	3	23.1	30.8	23.1	23.1
Minnesota	1	37		1				100.0		
Mississippi	28	44	8	1	11	8	28.6	3.6	39.3	28.6
Missouri	11	51		1	4	6		9.1	36.4	54.5
Montana	4	59				4				100.0
New Mexico	5	47	1		2	2	20.0		40.0	40.0
New York	4	50		1	2	1		25.0	50.0	25.0
North Carolina	30	46	7	2	12	9	23.3	7.7	40.0	30.0
Ohio	43	54	3	3	10	27	7.0	7.0	23.3	62.8
Oklahoma	8	52			3	5			37.5	62.5
Oregon	6	43		3	2	1		50.0	33.3	16.7
Pennsylvania	3	57			1	2			33.3	66.7
South Carolina	24	44	4	3	12	5	16.7	12.5	50.0	20.8
South Dakota	1	44			1				100.0	
Tennessee	36	45	7	4	17	8	19.4	11.1	47.2	22.2
Texas	2	38	1		1		50.0		50.0	
Utah	2	62				2				100.0
Virginia	13	48	2	2	2	7	15.4	15.4	15.4	53.8
Washington	8	62			1	7			12.5	87.5
West Virginia	15	47	3	4	2	6	20.0	26.7	13.3	40.0
Total	527	47	93	54	152	228	17.6	10.2	28.8	43.3

*Canada*

Provinces	Total Number	Average Age	Number				Percentage			
			Under 35	35-40	41-50	Over 50	Under 35	35-40	41-50	Over 50
Alberta	1	57				1				100.0
British Columbia	3	42	1	1		1	33.3	33.3		33.3
Quebec	24	39	11	5	5	3	45.8	20.8	20.8	12.5
Saskatchewan	1	35		1				100.0		
Total	29	40	12	7	5	5	41.4	24.1	17.2	17.2

health were established, training was obtainable only in the school of experience. As will be observed later, only a beginning has been made by health officers in taking professional training in public health.

Table I presents the age distribution of 48 state health officers and 9 provincial health officers. The state health officers have an average age of 56 and the provincial health officers 52. One provincial health officer is 37 years old. With this exception, all of the state and provincial health officers are 40 or over.

Of the 557 full-time county health officers in the United States in January, 1932, the available records did not give the ages of 30. The age distribution of the remaining 527 is given in Table II. In each of 2 states having 2 and 8 health officers respectively, or a total of 10, the average age is 62. In 10 other states there are 183 health officers with an average age of 45 or less. From Table II it will be noted also that in the group under 35 there are 93 county health officers in 20 states, and that in the 35-40 group there are 54, representing 18 states. These two groups, which may be regarded as including the potential students for schools of public health, have a total of 147. Among the county health officers in the states, 30 have had school of public health training—usually 1 year. As of January, 1932, Tennessee reported 5 county health officers who have had school of public health training, and Maryland 5, whereas 13 other states reported only 1 or 2 with such training.

In Canada, there were 32 county health officers in January, 1932. Their age distribution by provinces is shown in Table II. The ages of 29 were available and averaged 40 years. Of these, 18 have had school of public health training. The record of Quebec is conspicuous, in that the average age of 24 of her 25 county health officers is 39 years, and 14 have had training in a school of public health.

In the United States, of the 966 cities having 10,000 or more inhabitants, only 407 have full-time health officers. Of 249 of these for which we have records, the average age is 52 years. Their age distribution will be found in Table III. Of the 158 full-time city health officers whose ages were not available, 150 are non-medical: 32 in Massachusetts, 51 in Pennsylvania, and 27 in New Jersey.

#### SUMMARY

1. The age distribution of 862 full-time state, provincial, city and county health officers is as shown in Table IV.

2. Of the 208 health officers under 41 years of age, 38 have attended schools of public health—a percentage of 18.2.

TABLE III

FULL-TIME CITY HEALTH OFFICERS GROUPED ACCORDING TO AGE, 1932

States	Total	Average Age	Number				Percentage			
			Under 35	35-40	41-50	Over 50	Under 35	35-40	41-50	Over 50
Alabama	9	54			3	6			33.3	66.7
Arizona	1	39		1				100.0		
Arkansas	3	50			2	1			66.7	33.3
California	21	51	1	2	5	13	4.8	9.5	23.8	61.9
Colorado	1	60				1				100.0
Connecticut	8	52		1	6	1		12.5	75.0	12.5
Florida	5	52		1	1	3		20.0	20.0	60.0
Georgia	11	53	1		5	5	9.1		45.5	45.5
Idaho	1	56				1				100.0
Illinois	12	52		1	7	4		8.3	58.3	33.3
Indiana	1	47			1				100.0	
Iowa	4	51			2	2			50.0	50.0
Kansas	4	44	1	1	1	1	25.0	25.0	25.0	25.0
Kentucky	6	52	1	1		4	16.7	16.7		66.7
Louisiana	2	65				2				100.0
Maine	7	55		1	2	4		14.3	28.6	57.1
Maryland	4	52		2		2		50.0		50.0
Massachusetts	3	54			2	1			66.7	33.3
Michigan	10	52	2		3	5	20.0		30.0	50.0
Minnesota	2	58				2				100.0
Mississippi	6	42	2		3	1	33.3		50.0	16.7
Missouri	4	61			1	3			25.0	75.0
Montana	3	59				3				100.0
New Hampshire	1	57				1				100.0
New Jersey	4	58			1	3			25.0	75.0
New Mexico	2	49			1	1			50.0	50.0
New York	9	56			3	6			33.3	66.7
North Carolina	14	49	1		6	7	7.1		42.9	50.0
North Dakota	1	53				1				100.0
Ohio	19	53		2	6	11		10.5	31.6	57.9
Oklahoma	4	43	1		2	1	25.0		50.0	25.0
Oregon	4	49		1	1	1		33.3	33.3	33.3
Pennsylvania	6	53			3	3			50.0	50.0
Rhode Island	2	63			1	1			50.0	50.0
South Carolina	5	43		1	4			20.0	80.0	
South Dakota	1	44			1				100.0	
Tennessee	5	43	1	2		2	20.0	40.0		40.0
Texas	9	47	3	1	1	4	33.3	11.1	11.1	44.4
Vermont	1	82				1				100.0
Virginia	9	49	1	2	2	4	11.1	22.2	22.2	44.4
Washington	6	58			1	5			16.7	83.3
West Virginia	9	49	3			6	33.3			66.6
Wisconsin	11	53	1	2	2	6	9.1	18.2	18.2	54.5
Total	249	52	19	22	79	129	7.6	8.8	31.7	51.8

TABLE IV  
AGES OF 862 FULL-TIME HEALTH OFFICERS

Kind of Health Officer	Under 35	35-40	41-50	Over 50	Total
State			9	39	48
Provincial		1	2	6	9
County ( <i>U. S.</i> )	93	54	152	228	527
County ( <i>Can.</i> )	12	7	5	5	29
City ( <i>U. S.</i> )	19	22	79	129	249
Total	124	84	247	407	862

3. In the age group under 35 there are 124 health officers, of whom only 25 have had university training in public health.

4. University courses should be supplemented by practical field training. As the age group 41-50 is at a decided disadvantage with respect to university courses, practical intensive courses should be offered for them.

5. Although the total number of health officers having diplomas in public health is still quite limited, the number taking the training and planning to take it is showing a yearly increase.

NOTE: The Directory of the American Medical Association was the source of our information as to the ages of health officers, and the *Public Health Reports* were consulted to ascertain the city health officers who are physicians and those who are not.

## Eye Defects in the Savage

IN the recent film called "Trader Horn" there were about 200 savage African tribesmen, especially imported from Africa by Hollywood. A group of eye specialists in California examined the eyes of every one of these men, with this interesting result: that the respective percentages of near-sightedness, far-sightedness, myopia, and other common eye defects were almost the same as the averages for men and women of America. Undoubtedly the abuse of our eyes is the cause of much defect in vision, yet this study of the savages' eyes shows that the human eye has a natural tendency to imperfection.

# Studies on Ringworm Funguses with Reference to Public Health Problems\*

LEE BONAR AND ALICE DOMSLER DREYER

*Department of Botany, University of California, Berkeley, Calif.*

THE type of skin infection commonly known as ringworm has long been a problem met by the physician treating skin diseases. During recent years this has come to be recognized as a matter of real concern for officers responsible for the administration of certain types of public institutions patronized by large numbers of our population. The high incidence of this type of infection has been repeatedly observed and pointed out. During the past 3 years studies have been carried on at the University of California at Berkeley, by Drs. Robert T. Legge and H. J. Templeton, of the Earnest V. Cowell Memorial Hospital, and the writers of the Department of Botany.† Certain aspects of the work have been,<sup>6</sup> or will be reported elsewhere, while the results of laboratory studies on certain phases of the work are herewith given.

The funguses causing this type of infection are found in the epidermis and the hair growing on infected areas of the body. Skin scales and hair are separated from these lesions and bear the hyphae, Figure I, which are viable and capable of starting a new growth of the fungus given favorable conditions.

Such fungus bearing material is especially apt to be dislodged in dressing rooms and in showers. These infectious materials on the floors of rooms used by numbers of individuals form a ready source of infection for the feet of other persons. The high incidence of this type of infection on the feet of persons using such rooms certainly lends very strong evidence to the support of this as a common method of spread.

Is the fungus material so deposited capable of making actual growth on the floor surface and so multiplying the possible source material for infection? These funguses are well known to be keratin

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loving organisms growing vigorously on materials such as hair, wool, silk, horn and feathers. Data as to their ability to grow on other types of natural materials are very scarce. An effort has been made to collect evidence as to the possibility of growth on materials such as are to be commonly found on the floors of dressing and shower rooms. Repeated examinations have consistently shown the presence of quantities of hair in any cracks in floors, between boards, under lattice work drain boards, and under mats or in cracks in cement.

Microscopic examination of hair from such situations, where there is sufficient moisture, will often show the presence of fungus growth on and in the hair. This type of fungus growth has not been demonstrated to be that of a dermatophyte, due to the great difficulty of isolating these comparatively slow growing organisms from such material. Material consisting of hair and other debris from the cracks in floors was brought into the laboratory, moistened with distilled water, and sterilized. Pure cultures of a number of species of ringworm funguses were planted on such material, and all yielded growth, showing that such material, when afforded sufficient moisture, will serve as admirable food material for the growth of these funguses.

The question as to whether these dermatophytes are able to make actual growth on wood as do many other funguses has lacked a satisfactory answer. Specimens of new sound wood of different types,

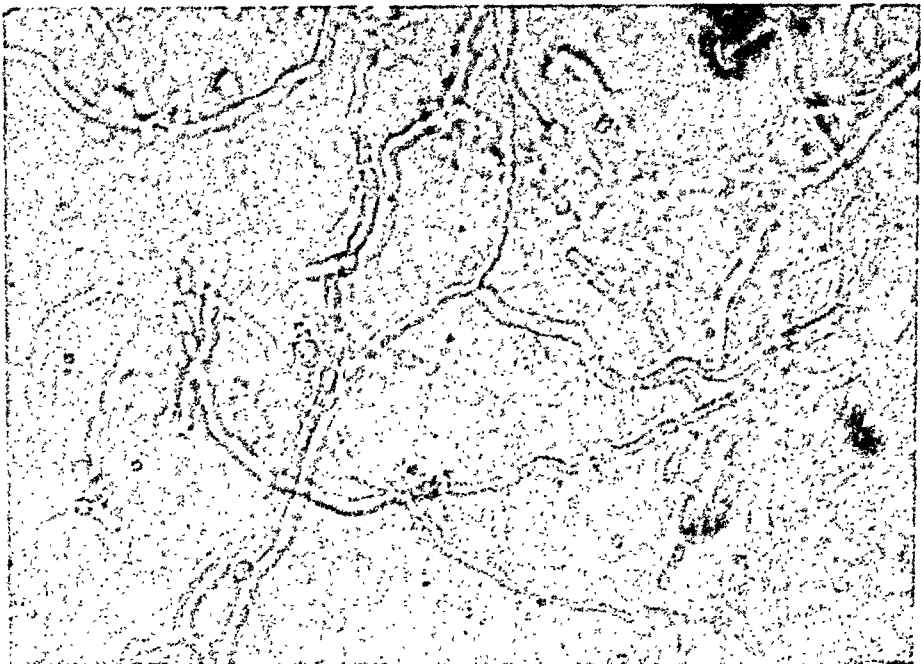


FIGURE I.—Photomicrograph showing mycelium of *Trichophyton interdigitale* imbedded in skin scale

oak, Douglas fir, and pine, were sterilized in flasks after moistening with distilled water, and then inoculated from cultures of a number of species of dermatophytes. These cultures were kept under conditions favorable for possible growth for 6 months' time, but there was no detectable development of fungus in any of the cultures.

Samples of wood were taken from the floor of an outdoor pavilion where the floor boards were somewhat weathered and discolored on the surface due to some years' exposure, but were still apparently sound. These were placed in bottles with distilled water and autoclaved. Blocks of sound new wood were prepared as checks. These were inoculated with fragments from tube cultures of *Trichophyton interdigitale* Priestley, and kept at room temperature. No growth on sound new wood of check. Twelve samples of weathered wood were used. Growth of the fungus developed on three blocks. The growth was very slow in developing and somewhat limited in its extent.

Those failing to show growth were examined by reculturing on agar medium from the inoculum placed on the block, and positive cultures showed that the fungus was viable, but unable to grow except on certain blocks, these apparently affording the food material necessary while others did not. This demonstrated that such old weathered wood may possibly support a growth of this type of fungus.

A point of equal or greater importance to be considered, is whether these funguses may possibly grow on material accumulating on the surface of the floor regardless of the type of floor considered. Surfaces that are subject to frequent wetting tend to accumulate a film or coating of slime. This may in some cases, when not thoroughly cleansed at frequent intervals, show a greenish color due to the growth of algae.

Portions of sound boards, blocks of cement, and bricks that had been thoroughly soaked by continued exposure to wetting for some time, and showed an accumulation of such slime, were taken into the laboratory, placed in culture chambers, and sterilized. The surface was inoculated with a pure culture of *Trichophyton interdigitale*, and they were held at room temperature. A very evident and rapid growth of the fungus resulted (Figs. II and II A). Scrapings of algal growth were made and this material was sterilized and then inoculated with pure cultures. Rapid and abundant growth of the fungus resulted. It is therefore evident that any accumulation of such algal or bacterial slime on the floor or beneath floor mats or drain racks will afford materials for the actual growth and development of this type of fungus, and such growth yields spores readily distributed on any object coming in contact with it. Cracks and fissures in floors would

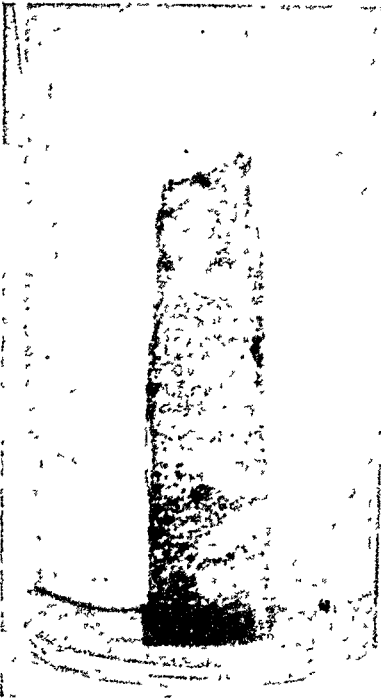


FIGURE II—Sound wood covered by brown slime, 2 weeks after inoculation with *Trichophyton interdigitale*



FIGURE IIA—Cement block covered with thin greenish slime, 2 weeks after inoculation

often retain sufficient moisture between times of wetting to sustain the growth of the fungus. The cultures shown in Figure II were allowed to dry out in the laboratory and remain dry for 6 months. Subculturing from the surface of these after such drying yielded positive cultures, showing that the fungus may remain viable over rather long periods of ordinary drying. It is, therefore, evident that such growth may remain as a source of dissemination of the fungus over indefinite periods of time.

It appears evident from the data here presented that an important factor in the possible prevention of infection is the elimination of conditions that will permit the possible growth of fungus on floors. Hosing down floors will not be sufficient to remove such material, due to the tenacity with which such materials adhere to the floor. This will be especially true of material under mats and grill work sometimes found on floors and runways. Thorough scrubbing at frequent intervals will be of prime necessity, and possibly the application of disinfectants to the floors.

A series of tests has been made on the action of disinfectants on growths of these funguses in such materials as are found on floors. The materials most likely to serve as food for the growth on floors are: hair, accumulations of slime and algal growth, and skin scales. The



preparations used must be such as to be non-irritating to the feet, and the cost of the materials such as to make application practicable.

Zinc chloride solutions are known to have high fungicidal properties, and are used widely as wood preservatives for the prevention of the growth of wood destroying fungus.<sup>9</sup> Tests on the action of zinc chloride solutions were made as follows: cultures of *Trichophyton interdigitale* were grown on bundles of human hair in culture tubes. When there was vigorous growth on these hair cultures the bundles of hair were laid on blocks of wood that had been placed in large culture dishes and sterilized. Before sterilization the blocks were wet with the zinc chloride solution and enough of the solution provided so that the blocks were about half covered by the solution.

The growing cultures were laid on the surface of the moist blocks, and time allowed for the diffusion of the disinfectant into the hair mat, without immersing it in the solution. This treatment would more nearly approximate the conditions to be met with on a floor surface than would be the case if the growing cultures were simply immersed in the disinfectant solution. Portions of the hair mat were removed at intervals and subcultured for growth of fungus, and results are shown in Table I.

TABLE I

ACTION OF ZINC CHLORIDE SOLUTIONS ON CULTURES GROWING ON HUMAN HAIR

Percent ZnCl <sub>2</sub>	No. of tests	Time of exposure									
		1 hour		1 day		2 days		4 days		7 days	
		Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
13.6	3	3	0	3	0	3	0	1	2	0	3
6.8	13	13	0	12	1	11	2	5	8	0	13
5.0	6	6	0	4	2	4	2	4	2		
5.0	5			4	1	3	2	1	4	0	5
2.0	11	11	0	11	0	11	0	10	1	10	1

The killing action was due to the permeation of the hair mats and strands by the zinc chloride. This penetration was checked by removal of the hair mats after killing and repeatedly washing in distilled water. Tests for chlorides gave positive results after repeated washings, showing that there had been extensive penetration of the hair mats.

The results of these tests show a high degree of killing by this agent, in concentrations of 5 per cent or more. The time necessary for killing is rather long, but the high degree of impermeability of the hair, within which much of the fungus material is encased largely accounts for this slow action. It seems that the application of this compound might be advisable to wooden floors, especially in dressing rooms, where the salt would be concentrated in the surface of the wood by evaporation of the water. This residue would then serve to inhibit any fungus growth in organic materials accumulating in cracks in the floor, and apt to become moistened occasionally. Zinc chloride would not seem an advisable disinfectant for the floors of shower rooms, where they are subject to frequent flooding, as it would be washed away before it had time to be effective.

Tests were carried out using some other probable disinfectants, applying them more particularly to accumulations of slime on the surface of wood or blocks of concrete, such as are shown in Figures II and IIA. These slime covered blocks were sterilized in bottles or wide culture dishes, containing small amounts of distilled water, and then inoculated with pure cultures of *Trichophyton interdigitale*. After 2 weeks' time, when a vigorous growth of the fungus had developed on the surface of these blocks, they were transferred aseptically to vessels containing the disinfectant. They were completely immersed in the disinfectant and shaken to insure, as much as possible, thorough contact of the solution with all parts.

After 15 minutes' exposure the blocks were removed to sterile containers and allowed to drain. Subcultures were made at that time in nutrient broth tubes. The blocks were allowed to stand in the containers, and subcultured again after 24 hours. The results of these tests are shown in Table II.

TABLE II

ACTION OF DISINFECTANTS ON FUNGUS GROWING ON THE SURFACE OF SLIME COVERED BLOCKS

Material	Time	1 Per cent Sodium hypochlorite		1 Per cent CuSO <sub>4</sub>	
		Positive	Negative	Positive	Negative
Wood blocks	15 min.	11	3	7	0
Wood blocks	24 hrs.	7	17	7	0
Brick	24 hrs.	0	4		
Concrete	24 hrs.	0	4		

The sodium hypochlorite solution was prepared from standard commercial solutions on the market. The copper sulphate solution was prepared by using the common hydrate  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ .

The results here shown, although for a small number of tests, indicate that sodium hypochlorite solutions must remain in contact with this material for a considerable period of time to be appreciably effective. The copper sulphate solution is entirely ineffective in the concentration, and for the time intervals used. These results strongly indicate that the probabilities of attaining successful disinfection of such surfaces are slight, unless the disinfectant is to remain on the surface for at least a number of hours. The disinfective action will evidently be in inverse ratio to the amount of organic matter on the surface, and this emphasizes the need for a high degree of cleanliness on such floor surfaces.

A series of tests on the action of sodium hypochlorite on dermatophytes imbedded in skin scales was made. Fragments of skin were collected from cases that on culturing yielded a high percentage of positive cultures of *Trichophyton interdigitale* and *Epidermophyton cruris*. These fragments were soaked in a 1 per cent solution for varying periods of time, washed in sterile water, and planted on nutrient agar. The results are shown in Table III.

It is obvious from these results that a high percentage of killing of these fungi is attained only after exposure to the solution for 1 hour or longer. This becomes an important point in connection with the use of such solutions in foot baths. This same sodium hypochlorite solution shows a complete killing action on spore suspensions of these fungi in 5 minutes in dilutions up to 1-5,000. The degree of disinfection attained depends on the readiness with which the solution comes in actual contact with the fungus hyphae. The fungus material imbedded in hairs or in skin scales is encased in material that

TABLE III  
DISINFECTANT ACTION OF 1 PER CENT SODIUM HYPOCHLORITE ON SKIN SCALES  
INFESTED BY DERMATOPHYTES

Organism	Control		Time of exposure					
			10 minutes		30 minutes		60 minutes	
	Plants	Positive	Plants	Positive	Plants	Positive	Plants	Positive
<i>Trichophyton interdigitale</i>	60	33	50	18	50	11	50	3
<i>Epidermophyton cruris</i>	30	14	60	10	10	7	60	0

is very highly impermeable to anything in a watery solution, and this is a fact that must be kept in mind in this work.

Another method of avoiding the possibility of infection from the floor is by the use of bath shoes, to prevent the feet from coming in contact with the floor. Such a procedure is followed in certain institutions, and the evidence to date is such as to lend very strong support to this procedure.<sup>6b</sup> The enforcement of regulations concerning the wearing of shoes in public institutions adds to the troubles of the officers in charge, and may be difficult in some instances, but the wearing of shoes will eliminate to a very high degree the possibility of the bather coming in contact with the infectious material.

Bath shoes are of various types and materials, such as rubber, paper, leather, and wood. Laboratory tests have shown that the dermatophytes are capable of making growth on leather (Figure III) when it is kept moist, although such growth is exceedingly slow, and many tests have yielded negative results.

Attempts to grow fungus on strips from rubber bathing shoes have shown that it was not able to grow on sponge rubber such as is commonly used in bathing shoes, but one series of tests showed growth on the fabric lining from rubber bath shoes (Figure III). These shoes had been used for some time, and the growth of the fungus might possibly be accounted for by the accumulation of organic matter in the fabric, or by materials with which the fabric was impregnated. This idea is advanced, since we have been unable to demonstrate that these funguses are capable of digesting clean cellulose material. Similar tests made on material from old bathing shoes that were made of sponge rubber alone have yielded only negative results.

#### THE DISINFECTION OF CLOTHING IN RELATION TO POSSIBLE PREVENTION OF INFECTION

Due to the nature of this disease it is evident that clothing, towels, and bath mats used by individuals suffering from this type of infection may readily bear skin particles permeated by the living hyphae of these funguses. This has been quite generally accepted as a condition of fact; and where such clothing is subject to common laundering there is a strong likelihood that the infectious material may be generally distributed to the articles so handled. This is the basis for the name commonly applied to this type of infection in one country where it is known as "dhobie itch." The name, dhobie, is that applied to the native laundryman.<sup>1</sup>

It can be readily demonstrated that these funguses are able to make vigorous growth on wool and silk fabrics, when there is sufficient

moisture present, Figure IV. They actually grow in and on the strands of the fabric and digest them, so that eventually there is a breakdown and disappearance of the material of which the fabric was composed. Repeated tests of this type have failed to yield evidence that these fungi are able to attack and digest the cellulose materials of cotton or linen fabrics. Certain statements may be found in the literature<sup>3,4</sup> to the effect that they may grow on cotton, but no definite experimental data are given to support this in any report that has come under our survey. Physiological studies show that they require certain types of complex organic nitrogen compounds as a source of nitrogen for their development, and these substances are entirely lacking in materials made up of cellulose.

It is not likely that there would be sufficient moisture in soiled clothing to support an active growth of these fungi in the fabrics under the conditions commonly met with in handling such clothing, although certain cases have been reported where such seemed to be true. There are, however, rather frequently reported cases of infection of the hands of persons engaged in the handling of soiled clothing, as in local laundries.

Studies have been carried on during the past 2 years on the possible disinfecting action of standard laundry and dry cleaning processes on clothing or fabrics bearing viable fungus material.



FIGURE III—Two on left showing growth on fabric lining of rubber bath shoe; center, no growth on sponge rubber; 2 on right, growth on leather from shoe. Age of culture, 6 weeks

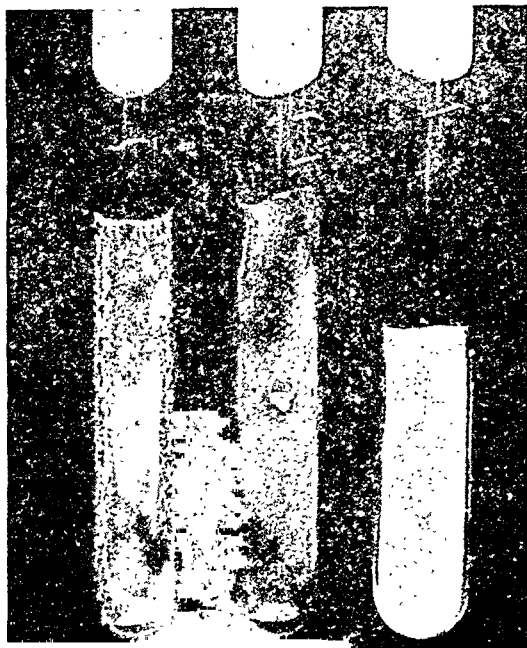


FIGURE IV—No discernible growth on cotton, beyond mass of inoculum

## TEMPERATURE STUDIES

In an attempt to demonstrate the effectiveness of standard laundry methods in incidental disinfection of articles that carry dermatophytes, the temperature factor is obviously paramount. Verujsky<sup>10</sup> reported results on thermal death point studies on spore suspensions of *Trichophyton tonsurans* and *Achorion schoenleinii*. He recorded the first killed after 10 minutes at 49° C., the latter not killed in the same time at 50° C. Weidman<sup>11</sup> reported results of some studies on the temperature necessary to kill a number of the species of dermatophytes in culture, and a brief mention of tests on one species when the material was imbedded in skin fragments.

The funguses used in our tests were: *Trichophyton interdigitale* Priestley, *Trichophyton rosaceum* Sabouraud, *Epidermophyton cruris* Castellani, and *Microsporon lanosum* Sabouraud. These were all grown in pure, bacteria free cultures, and tests were made as follows:

Cultures were grown on agar slants in test tubes until abundant sporulation was obtained. The time necessary for spore formation varies somewhat with different species, but the cultures used varied in age from 15 to 40 days. Spore suspensions were made by introducing into the culture tube a small quantity of sterile distilled water, and then gently working up a spore suspension from the surface of the colony with a soft platinum wire. This spore suspension was then taken off into a sterile tube and agitated to get a homogeneous suspension. Culture tubes were prepared, each containing 10 c.c. of a nutrient solution made up with 1 per cent peptone and 1 per cent glucose.

Five-tenths c.c. of the spore suspension was introduced into each culture tube, and the tubes were then heated for 10 minutes in a water bath which had been brought to the desired temperature. The temperature was read from thermometers held in blank tubes of the same size and containing the same amount of solution. The time interval was reckoned from the time at which the solution within the tube containing the thermometer reached the desired temperature.

At the end of the 10 minutes' exposure the tubes were cooled by immediate immersion in an ice water bath, to insure that the cultures were not exposed to a higher temperature for more than the 10-minute period. Controls were run for each test in tubes inoculated from the same spore suspension and incubated without heating. These cultures were then incubated at room temperature after treatment, and the results read after 14 days. For results see Table IV.

It is a well known fact to students of the dermatophytes that there is a considerable amount of variation in the morphology of these funguses when grown under different cultural conditions. When grown in liquid mediums there is a very considerable development of mycelium without any conidia formation for a period of time. Under certain conditions, especially as the cultures become older, there is a very abundant formation of chlamydospores in the hyphae. Thermal death point studies were made on the four above named species, using

TABLE IV  
CONIDIOSPORES (ALEURIES)  
TIME OF EXPOSURE 10 MINUTES

Temperature	<i>T. interdigitale</i>		<i>M. lanosum</i>		<i>E. cruris</i>		<i>T. rosaceum</i>	
	No. of tests	Positive	No. of tests	Positive	No. of tests	Positive	No. of tests	Positive
75° C.	14	0	2	0				
70	26	6	12	0			2	0
65	24	7	20	1	2	0	2	0
60	24	16	26	5	2	0	8	0
55	24	22	22	12	2	0	14	0
50	16	16	18	18	11	0	19	5
45			14	14	16	9	20	20
42					12	12		
control	15	15	14	14	5	5	7	7

young colonies of vigorously growing mycelium a few days old, before any spores were formed. Another series was run on material from old cultures in which a large percentage of the hyphal cells were rounded and swollen to form chlamydospores, but where conidia formation had been suppressed. The results of these tests made with several dozens of trials for each species showed that the thermal death point for both the young mycelium, and the chlamydospores was consistently a little below that for the conidia shown in Table IV. Since this was found to be true we are reporting here only the results on that phase requiring the higher temperatures to accomplish complete killing.

*Cultures Growing on Wool*—To each of several 125 c.c. Erlenmeyer flasks 50 c.c. of distilled water was added. To each flask was added 30 small squares (approximately 1 cm. in width) of white Botany flannel. This fabric is a closely woven all wool material. The flasks were sterilized and then inoculated with spore suspensions of the funguses and set aside until profuse growth had taken place, covering all the pieces of the fabric. Microscopic examination showed that the funguses had very completely permeated the fabric, and in some cases the fabric was seen to be digested away to a considerable degree. The squares were then transferred separately to tubes and heated as described above. After heat treatment they were transferred to agar slants and observed for subsequent growth. For results see Table V.

*Cultures Growing on Hair*—Thick bundles of human hair were placed in test tubes with 3–5 c.c. of distilled water, sterilized, and then inoculated with spore suspensions of the funguses. After sufficient growth had developed (2 to 4 weeks,

TABLE V  
CULTURES GROWING ON WOOL  
TIME OF EXPOSURE 10 MINUTES

Temperature	<i>T. interdigitale</i>		<i>M. lanosum</i>		<i>E. cruris</i>		<i>T. rosaceum</i>	
	No. of tests	Positive	No. of tests	Positive	No. of tests	Positive	No. of tests	Positive
70° C.	12	0						
65	20	2	2	0				
60	22	6	14	0	18	0	12	0
55	24	13	20	2	21	0	12	0
50	24	23	20	4	21	0	23	0
45	18	18	18	12	22	12	23	22
42	6	6	12	12	4	4	11	11
control	5	5	5	5	5	5	5	5

CULTURES GROWING ON HAIR

65° C.	6	0	6	0				
60	18	0	6	0	24	0	18	0
55	18	0	12	0	24	0	24	1
50	18	11	18	0	24	0	24	7
45	18	18	18	15	24	23	18	18
42			18	18	12	12	6	6
control	2	2	2	2	2	2	2	2

varying with the species) the entire growth was removed to sterile Petri dishes. The portions of the hair showing abundant growth were selected and separated into small units. These showed abundant growth on and in the hairs when examined under the microscope. Small wisps of infected hair were placed in broth tubes and heated, except for those used as controls. After heating they were cultured on agar slants and observed for further possible growth (see Table V).

*Skin Scales Infested with Fungus Material*—Since it is obvious that clothing and bath room fabrics used by individuals bearing this type of infection will carry skin fragments infested with these funguses, a series of tests were made to determine the temperature necessary to kill them in this condition. Collections of skin scales were made from patients and tested by laboratory culture. Those showing a high percentage of positive cultures from a number of plants were selected for test materials. The scales were cut into small fragments and subjected to heat treatment for 10 minutes in tubes of distilled water, then taken from the tubes and planted in agar plates. The results from these tests are summarized in Table VI.



TABLE VI

THERMAL DEATH POINT OF TWO SPECIES OF FUNGUS IMBEDDED IN SKIN SCALES.  
TIME 10 MINUTES

Organism	Control		Temperature							
			50° C.		55° C.		60° C.		70° C.	
	No. of plants	Positive	No. of plants	Positive	No. of plants	Positive	No. of plants	Positive	No. of plants	Positive
<i>Trichophyton interdigitale</i>	70	50	70	22	40	0	60	0	20	0
<i>Trichophyton rosaceum</i>	20	2	20	2			20	0	20	0

A consideration of the data here listed shows that the dermatophytes are not very highly resistant to heat treatment as applied under moist conditions. The killing temperature is shown to vary somewhat for the different species, *Trichophyton interdigitale* showing the greatest heat resistance, with *Microsporon lanosum* in second place. The effective temperatures here recorded are slightly higher for *Trichophyton interdigitale* than that recorded for complete killing of this species by Weidman,<sup>11</sup> but agree with his findings in that this species is more heat resistant than any other used. Our results and those of Weidman do not agree with the statement of Mitchell,<sup>8</sup> who asserts: "I have been able to culture *Epidermophyton inguinale* from tissue which had been brought to the boiling point in 15 per cent KOH, and obviously ordinary laundering would not kill this organism."

One factor that merits consideration at this point, is the degree of wetting of the material to be treated. In making up spore suspensions one often sees clumping of spores in and about air bubbles in the liquid, and the spores so situated would not be so quickly heated as those more isolated in the liquid. Tests made with *Trichophyton interdigitale* showed that when the spore suspension was shaken with glass beads, decanted, and made up in a more homogeneous suspension, the thermal death point was 5 degrees lower than that shown in our table. Since such a procedure could not be followed in ordinary disinfecting practice it seems better to depend on the figures shown in the table. Practically all laundry treatment of fabrics involves the use of soap, and soap solution serves to lower greatly the surface tension of the bath, and so facilitate complete wetting of all particles.

A number of tests have been made on the possible fungicidal action of soaps. Spore suspensions were made up in 1 per cent soap solutions

(on the basis of dry weight), and allowed to stand for periods of 5, 10, and 15 minutes. Subsequent culturing of these spores on a nutrient medium showed no detectable killing or inhibiting action by the soap. Heating of spore suspensions in such soap solutions showed that the temperature necessary for killing action on *Trichophyton interdigitale* is between 60° C. and 70° C. These tests indicate that there is no appreciable fungicidal action exerted on these funguses by the ordinary soaps that are used in the bath for fabrics, although soaps have been shown to have bactericidal action in such baths, by the work of Elledge and McBride.<sup>2</sup>

#### THE EFFICIENCY OF STERILIZATION OF INFECTED ARTICLES BY STANDARD LAUNDRY ROUTINE

Practically all owners of power laundries in the United States are members of the National Association of Laundry Owners. This body functions to promote the establishment of a standard routine procedure most in keeping with the satisfactory functioning of the business, and this standard routine is more or less adhered to by power laundries throughout the country. By reference to their *Manual*<sup>5</sup> it is found that soiled articles undergo various treatments, which differ primarily according to the fabric, color, weave, and to some extent to the degree to which they are soiled. As the public demands the return of visibly clean and undamaged goods, the laundry finds it necessary to employ the most tempered process that will accomplish this result.

The standard process prescribed for moderately soiled white cotton and linen articles (knitted wear excluded) may be summed up with reference to temperature as follows:

During washing and rinsing such articles are subjected to temperatures of approximately 100° F. (38° C.) for 10 minutes, 120° F. (49° C.) for 5 minutes, and 150° F. (65° C.) for 40 minutes. Soap and soda ash are added to the first two baths. Dirty bundles are subjected to a temperature of approximately 195° F. (90° C.) for 25 minutes. After washing and rinsing the treatment varies with the nature of the article, being either ironed, pressed, or sent to the drying room. Articles ironed or pressed are subjected to a temperature of approximately 320° F. (160° C.) for a short time, while those in the drying room are at 212° F. (100° C.) for approximately 15 minutes.

It is seen from the above that there is little chance of the survival of any of the dermatophytes in view of their heat resistance as shown in the laboratory tests.

Colored cotton articles (except hosiery) are treated as follows:

They are washed for 10 minutes in a bath containing soap and soda ash at 100° F. (38° C.) and this is followed by three 10-minute washings at 120° F.

(49° C.). Rinsing is carried out at this same temperature for about 15 minutes. Following this they are ironed, pressed, or sent to the drying room.

It cannot be stated with certainty, from the viewpoint of the heat resistance of the organisms that this treatment will kill *all* dermatophytes that may be present, although it is obvious that killing would be very nearly complete.

Colored cotton socks, knitted cotton underwear and woollens receive a common type of treatment during the washing process.

The first washing is in soapy water at 100° F. (38° C.) for 25 minutes, and this is followed by three rinsings of 5 minutes each at the same temperature. The subsequent treatment again depends on the nature of the fabrics. Since drying at high temperatures causes shrinkage, these articles are not subjected to such high temperatures, nor are they held in the warm bath for such long periods of time as are common cotton articles.

There is no standard procedure for silks, because of the great variation of articles received. Nevertheless, the washing and rinsing temperatures never exceed 100° F. (38° C.), and excessive temperatures for drying or ironing processes are avoided. Silk mixtures and artificial silks are treated as is pure silk.

From the above account it can readily be seen that the killing of the dermatophytes in colored cotton socks, wool, and silk articles is extremely doubtful. It is on such articles, moreover, with the exception of towels, that the occurrence of the infected material is most frequent, because of the nature of the disease.

#### THE EFFECT OF DRY CLEANING SOLVENTS ON DERMATOPHYTES

Certain types of clothing that are not laundered are subjected to "dry cleaning." Such articles from individuals infected by these fungi may carry infectious material, and recommendations have been made<sup>7</sup> that soaking these articles in dry cleaning solvents would serve to clear them of the infectious material. Such treatment has been recommended for woollen socks to prevent reinfection of cases under treatment. The substances more commonly used for dry cleaning solvents are hydrocarbons, such as gasoline, kerosene, and benzene. Carbon tetrachloride is a component of certain cleaning mixtures.

A series of tests has been made to determine the action of these solvents on four species of dermatophytes. Cultures of the fungi were grown in flasks on fragments of wool fabric and on hair until the mycelium had thoroughly permeated the material. The materials bearing these were removed to dry sterile filter flasks and dried in a 32° C. incubator for 5 days, until they were quite dry. They were then flooded with an excess of the cleaning solvent, and agitated to

insure a complete wetting of the surface of the fibers and hyphae of the funguses by the cleaning agent. The agent used in these tests was Cleaners' "naphtha." After the desired time exposure the fluid was poured off and the wool and hair materials completely dried by passing through the flasks a current of air that had been filtered free of micro-organisms. The particles were then removed to culture tubes containing a nutrient medium, and observed for subsequent growth, and their identity was checked. The results of these tests are shown in Table VII.

TABLE VII  
RESULTS OF THE EXPOSURE OF GROWING CULTURES TO "NAPHTHA" AND  
SUBSEQUENT RECULTURING  
CULTURES GROWING ON HAIR

Time in solvent	<i>T. interdigitale</i>		<i>M. lanosum</i>		<i>E. cruris</i>		<i>T. rosaceum</i>	
	No. of tests	Positive	No. of tests	Positive	No. of tests	Positive	No. of tests	Positive
15 min.	54	54	30	30	30	15	30	30
30 min.	29	29	30	30	30	3	30	30
60 min.	30	30	30	30	60	7	30	10
control	3	3	3	3	4	4	3	3

CULTURES GROWING ON WOOL

15 min.	30	30	30	30	25	25	30	30
30 min.	30	14	30	28	20	14	30	10
60 min.	30	21	30	10	18	3	30	9
control	4	4	3	3	4	4	4	4

It is seen from Table VII that there is very little killing action in these species under 1 hour of exposure, and in no case is it complete in 1 hour's time. The percentage of killing is higher with *Epidermophyton cruris* than with the other three species; this species also gives less vigorous growth on hair than the others used.

Tests of the action of naphtha, kerosene, and carbon tetrachloride on spore suspensions showed no appreciable killing action after 5, 10, or 15 minute exposures.

Tests of the possible killing action of some dry cleaning solvents on mycelium of these funguses imbedded in skin scales were made. It is in the skin scales that the fungus material lodged in clothing will

almost always be found. The action of the solvents on such scales will serve to give us a rather accurate measure of their disinfectant action.

TABLE VIII  
RESULTS OF SOAKING SKIN SCALES BEARING *Trichophyton Interdigitale*  
IN SOLVENTS AND SUBSEQUENT CULTURING

Solvent	Control		Time of exposure							
			30 min.		60 min.		90 min.		120 min.	
	No. of plants	Positive	No. of plants	Positive	No. of plants	Positive	No. of plants	Positive	No. of plants	Positive
Naphtha	20	7	20	3	20	4			20	4
Kerosene	30	12					20	8		
Carbon tetrachloride	20	7	20	7	20	4			20	5

The results recorded very clearly demonstrate that there is at best a very light disinfectant action by dry cleaning solvents on the ringworm fungi that may be borne on the clothing treated.

There is considerable variation in the procedure followed in the handling of articles to be dry cleaned, depending on the nature of the garment, the degree to which it is soiled, and the equipment of the cleaning establishment. In the better equipped standard establishments the treatment for a great many routine articles is immersion and agitation in the solvent for from 1 to 1¼ hours. Where the articles are immersed they must be subsequently dried, and there may be a very appreciable sterilizing action from the drying process, although the temperature is kept in all cases well below 100° C.

#### SUMMARY

1. Attempts to grow fungus on sound clean wood have yielded only negative results.
2. Fungus may grow readily on floor material that is covered by a coating of slime or algal growth.
3. Results of the application of certain disinfectants to growth on slime covered blocks of floor materials are given.
4. The complete killing of *Trichophyton interdigitale* borne in skin scales, by 1 per cent sodium hypochlorite solution requires a time period of 1 hour or longer.

5. Thermal death point studies on spore suspensions, cultures grown in fabrics, and on material imbedded in skin scales show complete killing of the fungus in 10 minutes' time at 75° C., or lower in some cases.

6. The efficiency of the fungicidal action of standard power laundry practice is shown to vary with the nature of the fabric handled and with the temperature applied to the different materials. The standard practice for white cotton fabrics shows a good margin of safety, while that employed for woollens and colored fabrics is doubtful.

7. The application of standard "dry cleaning" solvents to these funguses, either growing in fabric, or imbedded in skin scales, is shown to have a negligible killing action, in exposures of 1 to 2 hours.

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## Bulgarian Parents and Teachers Organize

THE International Federation of Home and School announces the organization of the National Union of Parents and Teachers of Bulgaria, which plans the publication of pamphlets of information and the organization of lectures on the principles and methods of the home and school movement.

# Health — Where Can It Be Taught?\*

CLAIR E. TURNER, DR.P.H., F.A.P.H.A. (*Life Member*)  
*Professor of Biology and Public Health, Massachusetts Institute of  
Technology, Cambridge, Mass.*

THE writer's chief qualification for preparing this paper, dealing with a subject involving such diversity of opinion and practice as health teaching in the senior high school, is perhaps that he has no ideal course or perfect program to suggest. For more than 10 years we have been experimenting in the development of health education methods in the City of Malden, but we began with the lower grades completing a program for each successive grade upon the basis of the pupil's previous training. The result is, that we have only within the last year begun the study of the senior high school.

Certainly it is a sound principle for the public school to begin its health training in the lowest grade and develop health behavior as rapidly as possible, gradually increasing individual responsibility as the child becomes older and supplying him from grade to grade with the supporting facts which make health behavior reasonable and which will enable him as an adult to determine sound health procedures when confronted with new situations.

It is unscientific, even if not uncommon, to consider the high school program without reference to what has been done in the lower grades. Communities which have not established a good health education program in the lower grades may need a temporary high school program based upon the need of the present generation of high school pupils. Such a program should be regarded as temporary, however, and should be changed with the changing needs of the pupils. It would be absurd to build a health education program by deciding first what instruction would be interesting to present in the senior high school and pass out those things which are left to the lower grades.

It is easier to form right habits in the first place than to replace bad habits with good ones. Moreover, only a small percentage of children reach senior high school. Both of these facts point to the obvious desirability of carrying each child as far as possible in health training in each grade. We must build the high school program as

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a protecting roof of knowledge and further individual adjustment upon the best structure we have been able to develop up to that time.

We will do well to consider some of the other principles of health instruction which apply both to high school and lower levels.

1. We must recognize the importance of a fresh approach in succeeding years of instruction. In health education we are training children—not merely presenting information. The fact that a habit is once established does not warrant the assumption that no further attention needs to be given to that item of behavior for the remainder of the school life of the child. It may be more difficult to maintain health practices at a higher grade level than it was to establish them at an earlier age. In any training program an appreciable amount of repetition is necessary. This makes obvious the necessity for some new material and a fresh approach in each succeeding year.

The program which we have developed experimentally in Malden may be used to illustrate what we mean by keeping a fresh approach. In the first 2 grades the program is one of informal health habit training without the attempt to present information as such. In the third grade a health reader is used as a guide to the health training program and the pupil is held responsible for a small amount of health knowledge. In the fourth grade the pupil has his first textbook which emphasizes the “how” of health training, with an appreciable increase in the number of health habits or details of behavior considered. In the fifth grade the pupil continues health training with the study of the “why” of health practices considered in terms of illustration and analogy from his own field of experience. In the sixth grade the new approach to health is through the consideration of the biological approach to cleanliness as it concerns the individual and the home.

Definite health instruction is maintained throughout the junior high school with its departmentalized program. This is practical and logical. The child demands further information to support the continued program of health training and a large number of these children will have no opportunity for schooling beyond the junior high school. In grade 7 the pupil goes forward from his recent study of cleanliness in the home to a consideration of the elements and principles of community health, both rural and urban. It is not difficult to associate instruction in personal habits with this subject, and this study, properly related to the work in civics, helps to build a citizen who will support suitable public health activities in his community. In grade 8 the pupil studies elementary physiology based upon a simple knowledge of structure and function and is given as



much information as is practicable for the individual who is without a knowledge of physics, chemistry, and general biology. In grade 9 a study of home nursing and child care is required of all girls. We are considering the possibility of developing instruction in food values and in first aid for the boys.

This summary shows not only the care which has been taken to secure a fresh approach, but also the kind of health background possessed by an increasing number of high school pupils as one city and county after another establish their own well-organized education programs in the lower grades. A course in senior high school in which subject matter and methods are mere repetition will be flat, stale, and unprofitable. There is serious danger of pitching health instruction in high school at too low an intellectual level.

2. We recognize that, although there are certain minimum general standards of health behavior, there is no single set of health rules which is satisfactory to all individuals. In the lower grades we are largely concerned with bringing the child up to some of these minimum standards. In the upper grades we should be increasingly concerned with showing him the difference between health rules and individual needs, in order that his lack of understanding may not develop a disgust for all general principles of health, and that he may study his own physical limitations and learn to live within them. The high school encourages rational action based upon principles rather than on propaganda.

3. We recognize also that health is taught not in the hygiene class alone but through *all* the experiences of the child. The pupil's 10 minutes with the school physician, for example, may contribute the most important piece of health instruction for the year. With this fact in mind, we recognize that the maintenance and conduct of school activities and the health material presented through other subjects of instruction are vital elements in teaching health.

Perhaps you are saying that most of the time has been spent in discussing everything but the senior high school program. When a jig-saw puzzle is put together except for one piece, the shape of the latter is perhaps better understood than as though it were described separately with reference to the other elements which make up the picture.

Our considerations lead us to the inevitable conclusion that health is taught in the senior high school in 3 ways: (I) Through the experiences of the pupil outside of class instruction, (II) Through health instruction correlated with some other subjects, and (III) Through direct instruction in hygiene courses.

I. In every high school the extra-instruction experiences of the pupils inevitably influence their present and future behavior in the right or in the wrong direction. There is neither time nor necessity for discussing in detail the school's responsibilities in this field. They include:

(a) Maintenance in school of those standards of sanitation which we teach as desirable. How often the failure to provide suitable handwashing facilities, sanitary conditions in toilet rooms, the sanitary distribution of drinking water, or the maintenance of satisfactory cleanliness convinces the pupil that the school does not really believe the things which it teaches!

(b) The provision of a medical, nursing, and dental service which approaches its task with a human consideration of the individual, with sufficient time allowance to function efficiently, and the purpose of demonstrating the constructive place of medical science in the life of the individual—rather than a hurried, mechanical, impersonal piece of scientific machinery which considers communicable disease and physical defects with little thought for the personality of the pupil or the attitude toward medical science which is being formed.

(c) The hygienic arrangement of the program, and the best possible coöperation with the home to make the pupil's school day hygienic. Here we have problems involving the length of the school day; the provision of suitable food, relaxation, and recreation; limitation of the pupil load and of extra-school activities; and the development of proper mental, social and emotional health among pupils through a type of school management which will provide right experiences.

II. The teaching of health through correlation is fundamental and important. It shows the pupil that health is a part of life, that healthful living is not a fad of the doctor or of the hygiene teacher but something which has the support of all intelligent people.

The activity program in physical education provides an unusual opportunity to contribute to the maintenance and further improvement of health behavior, constructively, indirectly, and without preaching. It is most important that a clear and coöperative understanding should be developed between the physical education program on the one hand, and health education with its ramifications into all activities of the school health program on the other.

The natural sciences, especially biology, and the social sciences, especially history, have unusual opportunity to provide instruction which will explain and support health principles and extend the appreciation of health values. Most subjects of instruction in the

senior high school can make some contribution to health, and in every course due consideration should be given to mental and physical health in developing the schedules and methods of instruction.

III. What should be done in direct health instruction? We believe that the answer to this question will be found in study and experimentation. Valuable studies and suggestions regarding the high school health program have been made.<sup>1, 2</sup> Doubtless many schools are now experimenting in direct health instruction. From extensive, honest, scientific investigation we shall get the best answers. The problems and the courses needed are not the same for all communities.

Various types of courses have been offered in the past. Some schools have given a course in health or hygiene in each year of the senior high school. We doubt the feasibility of this for pupils who have been exposed to a thorough health education program in the lower grades.

Some schools have provided elective courses for girls, touching the field of personal and social hygiene, under the direction of a teacher or nurse with the proper science and social background and with distinct and recognized ability. Under the direction of the right type of individual these courses have been very successful. The need of instruction in social and sex hygiene at the high school age level presents an important, difficult, and delicate problem, although the approach to such instruction is undoubtedly easier than it was a few decades ago. The apparently successful experiences of Dr. J. R. Earp in teaching social hygiene to mixed groups of college age is interesting, in this connection.\* Probably the time has not yet arrived to teach social hygiene in the high schools under that name or to teach it at all except at the election of pupils in separate groups of girls or boys. Much can be done in the presentation of scientific facts and in the development of right attitudes without any direct reference to sex hygiene.

It seems likely that our first experiment in direct health instruction in senior high school in Malden may be with a problem course for seniors who are not going to college. It will deal with those problems soon to be faced by the individuals as workers, citizens, and parents. Such a course, we feel, should relate to local and personal problems and be conducted in a sense after the seminar method, with the selection of specific problems to which pupils will bring the answer for consideration and discussion. It may be that we shall find that this

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\* Forthcoming article to appear in the report of the Denver, 1931, meetings of the Health Section of the World Federation of Education Associations. Address Miss Sally Lucas Jean, Secretary, 200 Fifth Avenue, New York City.

is not a sound or practicable answer to the need for some direct health instruction.

In summary then, we must recognize that health instruction in the senior high school must depend in large measure upon what has gone before, that whatever is presented must be largely new in material or approach, or both, and that the health teaching which is possible through pupil experiences outside of class instruction and through correlation may be more important than that which comes through direct instruction. This makes it clear that health education in the senior high school is in a large degree an administrative problem and this in turn suggests the importance of a health committee or a health counselor to assist the principal in meeting his responsibility for the development of an ideal health program.

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## Welfare Measures for Employed Boys and Girls, Czechoslovakia

A NATIONAL council for the protection of working boys and girls has recently been organized by the Ministry of Social Welfare of Czechoslovakia. This council consists of 18 representatives of young workers' organizations and is functioning under the chairmanship of the chief factory inspector. It is coöperating with 26 local councils, the organization of which is similar to that of the national council; the chairmen of the local councils are the district factory inspectors. In making the appointments to the councils, the minister of social welfare gives preference to persons with experience in social welfare work.

These councils are working on various questions arising out of the employment of boys and girls; jointly with the factory inspectors they enforce the labor laws as applied to boys and girls; they take part in the work of the public agencies for vocational guidance, vocational training, and protection of apprentices, and engage in general welfare work for boys and girls.—*Lehrlingsschutz, Jugend und Berufsfürsorge*, Vienna, May, 1932.

# Medical Participation in Public Health Work

HENRY F. VAUGHAN, DR.P.H., F.A.P.H.A. (*Life Member*)

*Commissioner of Health, Detroit, Mich.*

SOME activities now included in the program of most health departments can be transferred gradually to the general practitioner of medicine. In the interest of child health, in so far as practical, the family physician should become a practitioner of preventive as well as curative medicine. He should take an interest in seeing that his clients are protected against smallpox, typhoid fever, and diphtheria, and that adequate periodic physical examinations are made. The public health service should stimulate interest in extending postgraduate instruction to the general practitioner of medicine to interest him in this type of service, and also to establish reasonably uniform methods of procedure.”<sup>1</sup>

“The health department inaugurated in Detroit, in 1928, a program of participation by the general medical practitioner in official public health procedure, the ultimate objective of which was to secure the sympathetic and whole hearted support of the medical profession in order that the general practitioner might not only practice curative medicine but actively take his part and share his responsibility in the preventive medical program. A campaign to secure protection against diphtheria, for young children, more especially the preschool child, was used to interest and stimulate response from the general practitioner.”<sup>2</sup>

## ESSENTIALS OF PROGRAM

The essentials of a program may be briefly enumerated as: (1) actual medical participation; (2) preparation of the medical profession; and (3) preparation of the public.

Success depends upon a complete understanding between the local public health organization and the medical profession (as expressed through the department of health and the county medical society). Few, if any, medical societies are organized with suitable personnel or finances to carry through a program without the assistance of the health department organization. The two major parties

to the enterprise are: first, the public as represented through local government and specifically the health department; and second, the medical profession as represented through its organized society. While health councils may be desirable in certain communities, they are not essential if the health authorities and medical society will take the initiative, assume the lead, and coöpt such other agencies as have special interest in parts of the program—as for example, the tuberculosis society and other community health organizations and lay representation through such organization as the local chamber of commerce. In the dental field the local dental organization must participate. The medical society can best serve through a public health committee whose action should be reviewed by the council of the society. Every step should be worked out with the sympathetic support of the medical society and all new developments should be submitted to the society for its approval prior to final adoption by the health department.

*Preparation of the Medical Profession*—This involves: (1) a complete understanding by the membership of the local medical society and of district societies, if there be such; (2) the establishment of postgraduate medical conferences; (3) the employment of medical coördinators; (4) undergraduate instruction.

There must be continuous contact between the health department and the public health committee of the medical society, with regular meetings at least bi-weekly. Every opportunity should be available to present the program at the general meetings of the society and at the meetings of the district societies. Special meetings of the participating or coöperating physicians have been found desirable.

Postgraduate medical conferences in communicable disease control for the recognition of early cases of tuberculosis and for the discussion of periodic health examinations should be instituted. These should be designed to attract the physician interested in therapeutics but afford a splendid opportunity to instruct the physician concerning the newer methods of disease prevention. Such conferences have been held in Detroit during the past 3 years and at 10 conferences on communicable disease control there was an average attendance of 235 physicians and, all told, one-third of the membership of the medical society attended some of the lectures. This has created a sympathetic profession, and has not only served as a forum of instruction in modern preventive medicine, but has had the added effect of making better diagnosticians of the physicians and assisted in making more widespread, current knowledge concerning the treatment of communicable diseases. The medical conferences have been built around

the personnel of the communicable disease hospital, whose clinical facilities and staff have been drawn on freely.

There are, unfortunately, certain physicians who never or seldom attend medical meetings of any character and continue to practise medicine of the vintage of the days of their medical school. The employment of medical coördinators to visit such physicians in their own offices has assisted materially in preparing physicians.

In communities which support a local medical school, instruction should be given to the senior class both in the administrative mechanics of the program and in clinical demonstration of the treatment and control of communicable diseases.

*Preparation of the Public*—In addition to the preparation of the medical profession, the health department must actively pursue a program of popular health instruction directed (1) to the public as a whole, and (2) to the individual.

To secure maximum accomplishment in the actual practice of preventive medicine involves three-cornered coöperation of the public, the medical profession, and the department of health. All the known means of general health education should be employed, including such tools as the radio, newspaper stories, newspaper advertising, bill-board and street-car placards, talks to professional, business, social, and lay groups, and the generous distribution of educational material.

Individual education depends primarily upon home visitation by public health nurses (or other educators). Such system of visitation has been found extremely profitable in increasing the per cent of immunization of young children against diphtheria and has served to stimulate parental interest and responsibility. A personal letter addressed to the parent when the child attains the age of 6 months, followed within 10 days or 2 weeks by a home visit by a public health nurse, has materially increased the number of children under 1 year of age who visit the office of the participating physician and secure protection against diphtheria.

#### DIRECT OBJECTIVES

While the principal purpose of the program is medical participation, and instruction of the public to look toward the family physician for preventive as well as curative medical service, the direct objectives may briefly be summarized as (1) the protection of a high percentage of children between 6 months and 10 years of age against diphtheria, (2) vaccination for smallpox, (3) periodic health examination, and (4) periodic dental examination.

*Diphtheria Prevention*—Any health department which does not

organize itself to make available through the office of the family physician the facilities now recognized as available to the modern health department is missing its opportunity.

In Detroit, 1,100 physicians have become actively interested in preventive medicine. No free clinics exist for diphtheria immunization. In the fall of 1929, a communication sent jointly by the medical society and the health department was addressed to every physician, inquiring whether he would coöperate in the campaign by setting aside definite hours during which he would receive at his office, children in need of protection. It was agreed that the physician would charge \$1.00 for each dose of toxin-antitoxin or toxoid in those cases in which, in his judgment, the patients were able to pay for the service. The charge for the Schick test and the reading of the results would likewise be \$1.00, making a total of \$4.00 for the service.

There was nothing in this plan that would prevent the physician from charging his usual office fee if the patient appeared at any hour other than that specified in the agreement. It was further agreed that when, in the physician's judgment, the parent was unable or unwilling to pay for the service, the health department would reimburse the physician at the rate of \$.50 for each treatment and \$1.00 for the Schick test, or \$2.50 for the complete service to each child.

Under such agreement a list of coöperating physicians was established and the city was divided into 35 districts and a card was prepared for each district, listing the name and office address of each physician and designating the hours at which he would receive children for immunization. These lists were used for the convenience of contacting patient and physician and, more especially, by the public health nurses, who later canvassed the entire city.

The result has been that approximately 70 per cent of the preschool children and 80 per cent of the school children have received protective treatments without the use of free clinics. During the past 3 years this procedure has become accepted by the public and physicians, and is automatically bringing about the protection of a high percentage of the child population with a corresponding reduction in the diphtheria death rate.

The program of diphtheria protection has so awakened the interest of the physician in preventive service that during the past 3 years the percentage of preschool children protected against smallpox has increased from 22 to 43. It is obvious that protection against smallpox can be secured in the same manner as protection against diphtheria without the use of free clinics.



The next logical step in the program of medical participation is to secure a periodic health examination for individuals at all ages (from the infant to the adult). Of particular significance to the health department is the effort to find the minimal (or childhood type) case of tuberculosis. During the past year there has been built up in Detroit a group of 400 coöperating physicians who are interested in diagnosing early tuberculosis in children. The tuberculin test followed where indicated by a physical examination and X-ray study has been available at the office of the coöperating physician.

The same general procedure and educational program as described for diphtheria has been followed with the single exception that the health department had no funds with which to reimburse the physicians for non-pay patients. There is being instituted a system of reporting periodic health examinations and vaccinations for which report the health department is paying the physician \$.10 as a contribution against the bookkeeping costs. The county medical society has assumed the responsibility of making the periodic health examinations in schools.

A committee of the District Dental Society has placed in operation a service which involves (1) dental inspection of school children, (2) service for indigent adults, (3) part-pay service for semi-indigent children, and (4) regular pay service for children financially able to meet the usual fee. A list of coöperating dentists has been established and the health department participates in the educational program and in financing the mechanics of the program.

#### ADVANTAGES OF THE PROGRAM

*To the Medical Profession*—Advantages may be briefly summarized as (1) the elimination of free clinics; (2) increase in medical care to the 98 per cent of the population which is supposedly in good health and in normal times employed and better able to pay, which should result in decreasing service to the 2 per cent of the population which is ill at a given time; (3) joint direction and supervision of the program by the medical profession and the department of health; (4) maintenance of professional relationship between physician and patient; and (5) payment to physician at a reasonable rate for service rendered.

*To the Public*—Advantages to the public are briefly (1) a reduction in needless sickness; (2) a reduction in the cost of medical care through the prevention of disease; (3) the assurance of obtaining good medical care in connection with preventive services; (4) distribution of cost, so that those financially able make complete payment

while the load for the indigent is spread on the public tax roll; (5) the stimulation of parental interest and responsibility in disease prevention and the maintenance of personal health.

*To the Health Department*—The advantages to the health department are briefly (1) a reduction in morbidity and death rates, and (2) a conservation of public funds. Since, with the elimination of preventable diseases, the limited health department funds can be used advantageously elsewhere.

#### DISADVANTAGES

From the general viewpoint of medical care, the principal disadvantage of the Detroit plan is that it has been applied only to preventive medicine.

Basically, the plan involves two principles: (1) organized service, and (2) group payment for certain parts of the population. These same principles are fundamental to a program of curative medicine. The details of their application will not be discussed at this time but suffice it to say that their application does not mean any system of state medicine such as has been created abroad. It does involve group purchase of medical service through taxation for the lower wage earning classes. Organized medicine involves practice with available hospital, clinic, laboratory, X-ray, and research facilities. Such facilities already exist in most urban communities with varying plans of application. In rural districts a method of group purchase by taxation will readily provide an organized medical service which can be made attractive to the physician and beneficial to the public.

Several observers have also indicated that they object to the cost of the procedure in so far as diphtheria protection is concerned. It is recognized that the initial cost is high because the number of children in need of service is relatively high. Each succeeding year reduces the cost. Under no circumstances should the cost be charged solely to diphtheria protection but rather to a program of medical participation which will bring increasing dividends. However, in the Detroit experience in no year has the preventive service including payment to physicians exceeded the cost of hospitalization of the 50 per cent of reported cases of diphtheria hospitalized by the Department of Health. Therefore, the city, through its health department, is saving money.

Another disadvantage which should be mentioned is the difficulty of directing such a program. The medical profession by intuition and by training may not be prepared for such an undertaking but only time and mutual understanding between the medical society and the department of health can overcome such obstacle.

One other real difficulty is the time factor. It is granted that free clinics will receive more prompt response from the public but it has been demonstrated that in the course of 3 years one city has been able to bring about the protection against diphtheria of as high a percentage of its susceptible population as has any other city of equal size through the agency of free clinics.

None of the disadvantages are insurmountable. They are heavily out-balanced by the advantages.

#### REFERENCES

1. *Public Health Organization*, White House Conference Report, 1932, p. 49.
2. Geib and Vaughan, *The Physician as Health Worker*, *J.A.M.A.*, 97:366 (Aug. 8), 1931.

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## Safety Congress

THE Twentieth Annual Safety Congress and Exposition will be held in Chicago, October 12-16, 1932. The various sectional sessions will include Automotive, Cement, Chemical, Child Education, Community Safety, Construction, Delivery, Taxicab and Bus, Electric Railway, Fire Prevention, Food, Foremen's Forum, Home Safety, Industrial Health, Industrial Nursing, Laundry and Dry Cleaners, Marine, Metals, Mining, Packers and Tanners, Paper and Pulp, Petroleum, Power Press, Public Utilities, Quarry, Refrigeration, Rubber, Textile, and Woodworking and Lumber Manufacturing, and several sessions on Traffic.

## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

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## DO NOT LET UP IN HEALTH WORK OR FUNDS FOR HEALTH WORK

EARLY in his administration, the President of our Association sent out a letter calling attention to the dangers of the depression in regard to public health work, and urging that funds for such work should not be cut down. Instead of getting better, as some of our political optimists have prophesied so many times, the depression has grown worse and from practically every part of the country we get reports of depletion of funds for health work and the discharge of those engaged in it.

It, therefore, seems wise once more to call attention to the dangers of such a course. We are compelled to admit freely that, so far, the health of the people has not been affected as seriously as was anticipated, since 1931 was one of the healthiest years on record. This fact does not, however, satisfy public health people that damage is not being done, especially to children, and there is little question that this will be evident as time goes on whether things change for the better quickly or not. It is a source of satisfaction to us that our affairs are in such good order from the standpoint of health and health organization that we have been able to stand what we have been through without perceptible bad effects, at least as far as nutrition goes.

Other studies, however, have been made that show unmistakably the effects of the financial depression. One of the most interesting of these has to do with the mental health of the nation. More than 100 of the 173 state hospitals have been investigated by means of a questionnaire. While some of these show an increase in new admissions and re-admissions running as high as 20 to 35 per cent respectively, which are traced in part to the depression, when they are carefully analyzed and all factors taken into consideration, those who specialize in this branch admit that there is no rising tide of admission which can be ascribed to the prevailing economic conditions. Psychiatrists are convinced that they are seeing the results of an accumulation of strains rather than the effects of one particular factor. There is, however, a very marked change, directly traceable to the depression, in paroles and discharges. In every part of the country hospitals for mental diseases are having great difficulty in paroling and discharging patients who are well enough to leave. Work is hard to obtain. The families of the patients are in bad condition financially; so they object to receiving mental incompetents back again. It is stated by the Association Secretary of the National Committee for Mental Hygiene that paroles and discharges have diminished from 5 to as much as 20 per cent, in spite of the fact that some superintendents are making every effort to discharge patients when they are fit to go out.

Another result which probably shows the influence of several factors is shown in the birth rate, which is the lowest since the registration area was established in 1915. The 1930 rate was 19.8, while that for 1931 was 17.8 per 1,000 population. It hardly seems doubtful that the depression has had something to do with this. At the same time, the infant mortality rate has been very low, 61.7 per 1,000 live births.

Another feature which is good, as far as deaths and disability go, but is sinister in its origin, relates to occupational fatalities, which have declined 12 per cent from the figures of 1931. Every principal cause of accidental injuries has shown a marked decline, except automobile accidents, which increased 21 per cent. The fact back of this decline which would otherwise be welcome, is unemployment, there being at least 7 million unemployed in this country at present, while some estimates are much higher. By the same token, unemployment has added greatly to the worries, as well as the work of health departments, so that no comfort can be derived from the decrease in industrial accidents. There can be no doubt that there is much evidence of nervous and mental maladjustment, due to the depression, occur-

ring particularly among those who have been hardest hit, the unemployed and their families. Our suicide rate has risen markedly, showing the highest figure on record, except for one year just after the World War.

It is perhaps unfortunate that the statements here made will be read principally by those who already understand the situation and are working with us for a common object, the protection of our budgets for health work. We can only urge that every opportunity be taken to point out the facts to the proper authorities and to work personally, as well as otherwise, against cutting of budgets for health work. The Congress has adjourned without passing the emergency relief bill continuing and extending the help which was given for the drought area in 1931. In one state, alone, some 40-odd health workers have been left without employment. Their work which was calculated to produce permanent value has been discontinued. There is no question that a similar situation is more or less general, inquiry revealing that among more than 200 health departments there has been an average reduction in budgets of 7.4 per cent, some running as high as 43 per cent. Large cities have suffered most but counties and states have also been hard hit.

### A NEW JOURNAL

THIS *Quarterly Bulletin* has been brought into existence in order to make the material emanating from the Health Organisation of the League of Nations more generally available. It is not, however, an official organ and the Health Organisation does not assume responsibility for the opinions expressed in it, except when so stated.

The first volume is full of interesting material, beginning with the Resolutions of the Conference on Immunisation Against Diphtheria. Next there is an excellent report on Medical Education in England by Sir George Newman, and after that a report on the "Milk Supply of North-American Cities" by Professor R. Burri, Director of the Swiss Federal Institute for Milk Industry and Bacteriology. "Tropical Pneumonia" occupies 40 pages, followed by an excellent bibliography.

Perhaps the most interesting chapter is "A Second Analytical Review of Reports from Pasteur Institutes" on the Results of Anti-Rabies Treatment, by Lieut.-Col. A. G. McKendrick. Space permits only a brief summary. This second report which deals with the year 1929, covers 69,709 treatments which he compares point by point with 31,656 previously given.

Of those treated with killed vaccines, 0.80 per cent developed rabies, live vaccines 0.26 per cent, heated vaccines 0.15 per cent. Treatment paralysis was observed in only 6 cases. The incidence of paralysis for most vaccines corresponded closely with those given in the first report, while for dried or glycerinated vaccines the proportion fell from 1 in 464 to 1 in 5,302.

Non-Europeans run a much higher risk than Europeans—0.88 against 0.13. They are usually more severely bitten and on exposed parts of the body, treatment is commenced less promptly, and the biting animals prove more often positive. No evidence of special racial susceptibility has been discovered and there is no decisive evidence of the superiority of one method of treatment over another. An appendix gives the figures of the treatment at Sassari by Fermi from 1900 to 1930. Between 1900 and 1907, 700 persons were treated by the original Pasteur method, 2 of whom developed rabies, but they were both bitten on the bare skin of the head and in neither case was treatment commenced until the third week. From 1907 on, 3,974 persons have been treated by sero-vaccine and no case of rabies was developed. All persons treated were Europeans.

This volume ends with a survey of the Floods in China and the work undertaken by the Medical Director of Health against epidemics. Altogether the bulletin is most useful and we welcome its appearance.

#### REFERENCE

League of Nations, *Quarterly Bulletin of the Health Organisation*. American Agency: World Peace Foundation, 40 Mt. Vernon Street, Boston. Price \$2.00 per year. Single copies \$.50.

# ASSOCIATION NEWS

61ST ANNUAL MEETING, WASHINGTON, D. C.

## SCIENTIFIC TRIPS

THE Association meeting this year offers an unusual opportunity for delegates not only to visit those places of national interest in the field of politics, religion, science and the arts, but to observe some of the governmental operations in the fields in which the members of this Association are peculiarly interested. Since the customary and popular points of interest are well known to many of the delegates and will be elsewhere completely described, this article is intended to set forth in brief fashion the inspection trips which will be available. The local committee has attempted to make these interesting generally to representatives of all of the sections.

For the public health statisticians the Division of Vital Statistics of the Bureau of the Census will demonstrate the operation of improved machinery for the mechanical tabulation and recording of vital statistics, and if time is available special motion picture films will be shown.

The public health engineers will be afforded an opportunity to visit the Dalecarlia filtration plant which includes the modern rapid filters, pumping station laboratory, hydro plant, and alum manufacture. Another trip includes the sewage pumping station and District incinerators where the mosquito control operations of the U. S. Public Health Service will be explained by these officials.

At the National Institute of Health can be seen a number of scientific projects including the study of nutrition with special reference to the prevention of pellagra, the investigation of typhus and Rocky Mountain spotted fever,

tularemia, and meningococcus meningitis. The Institute is also conducting immunological studies on diphtheria, tetanus, and botulinus, and is officially charged with the testing of certain commercial biological products.

Students of nutrition will be interested in the laboratories conducting research along this line in the Bureau of Chemistry and Soils, the Food and Drug Administration and the Bureau of Home Economics of the United States Department of Agriculture, as well as in the Bureau of Fisheries of the Department of Commerce, so far as marine products are concerned. These trips will also be extended to inspect the laboratories and technicological work carried on in the Bureau of Dairy Industry and the Bureau of Animal Industry of the Department of Agriculture.

The Army Medical Center is composed of the Walter Reed General Hospital, the Army Medical School, the Army Dental School, the Army Veterinary School, and training schools for dietitians, physiotherapy and occupational therapy aides. These schools are engaged in research and teaching and the medical and veterinary schools make many biological products on a large scale—typhoid vaccine, mallein, tuberculin, rabies vaccine, etc. All of these departments and schools will be open to inspection and those interested in a particular phase of laboratory investigation can arrange for special visits.

The extensive library of the Surgeon General is in the Army Medical Museum where it is planned to arrange a special exhibit showing a graphic history of public health in the Army, as well as some special laboratory apparatus.



Optional trips can be arranged for St. Elizabeths Hospital, the Naval Medical School, and for the Children's Bureau of the Department of Labor, the work of which will undoubtedly be of interest to the members who are concerned with vital statistics, child hygiene, public health education, and public health nursing.

A special trip immediately following the close of the meeting has been arranged to visit the School of Hygiene and Public Health of Johns Hopkins University at Baltimore. The activities of this institution should enlist the attention of epidemiologists and public health officers; in fact, the School of Hygiene should appeal to all interested in public health in its many aspects.

Other points of interest at Baltimore where provision will be made to receive

visitors are the Johns Hopkins Hospital, the Welch Memorial Library, and the laboratories of the State Department of Health and the City Department of Health.

Some of the Government buildings and laboratories will be within easy walking distance of the Willard Hotel and no special arrangements for transportation will be made. For places more remote, bus transportation is to be provided. The trip to Baltimore is a special trip, the cost of transportation to be defrayed by the individual members. Considerable reductions in round trip railroad and bus fares are available for those who will return to or through Washington.

Information in detail and the schedules for all inspection trips will be available at the registration desk.

#### SCIENTIFIC EXHIBIT OF THE INDUSTRIAL HYGIENE SECTION

FOR a number of years, exhibits have been an important feature of the Annual Meeting. Whether sponsored by commercial organizations or otherwise, they are always educational.

The Association has experimented with extensive popular health "shows" to which the public has been invited, notably at Chicago in 1928, and at Minneapolis in 1929. While these were well attended and occasioned favorable comment, the general feeling has been that exhibits entirely technical in character and designed to interest professional public health workers were more in keeping with the professional spirit of the American Public Health Association.

No one section of the organization has sponsored an exhibit up to this time. For the Washington meeting the Industrial Hygiene Section is arranging one to illustrate the progress and problems in preventive medicine in industry. There will be nine units of space covering more than 650 square feet.

The U. S. Bureau of Mines has been allotted four units to portray some present-day industrial hazards. Scientific apparatus will demonstrate methods of dust collection. Conditions induced by dust will also be demonstrated. These important exhibits are under the direction of Dr. R. R. Sayers.

Dr. Louis Schwartz of the U. S. Public Health Service has accumulated a mass of data as a result of his numerous studies of skin diseases in various industries. He draws on his experiences and records in arranging his exhibit on Industrial Dermatoses.

Recognizing the possible hazards resulting from the increasing use of certain toxic gases and volatile liquids in industry, the Committee on Exhibits has invited Dr. E. R. Hayhurst to demonstrate apparatus for determining the presence of poisonous gases. Part of Dr. Hayhurst's exhibit will deal with occupational diseases in Ohio, with special emphasis on Silicosis.

The American Social Hygiene Association's exhibit "Syphilis in Industry" will indicate the importance of syphilis as an industrial hazard, with suggestions as to what may be done about it. The subject will be approached under the following headings: Prevalence of syphilis in the general population, utilizing the most up-to-date statistical data available; the direct relation of syphilis to industry; illustrations of how syphilis is handled in representative concerns; suggestions for industry in remedying the situation; suggestions as to general community measures; and ways in which the American Social Hygiene Association is prepared to help industry.

Other demonstrations and displays of equal importance are in the process of being assembled.

One exhibit which falls outside the interests of the Industrial Hygiene Section, but which the committee considers

so worthwhile as to include, is sponsored by Dr. Henry F. Vaughan, Health Commissioner of Detroit. It deals with a coöperative community public health program, worked out between the local medical society and health department, as a means of increasing the number of persons reached through preventive medicine and health promotion activities by stimulating and making possible an increasingly greater practice of these services by private physicians.

Delegates to the Washington Annual Meeting are urged to inspect this first attempt of one section to interpret its work and aims to other public health specialists. There is much valuable information to be acquired by a study of the exhibits. It is hoped that the effort of the Industrial Hygiene Section will stimulate other groups in the Association to similar activity at meetings in the future.

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

### *Health Officers Section*

Roy W. Benton, M.D., Shorewood, Wis., Health Commissioner  
J. D. Brook, M.D., Kent County Health Department, Grand Rapids, Mich., County Health Officer  
Oscar M. Craven, M.D., City Hall, Springfield, O., Director of Public Health  
Glenn C. Dowell, M.D., Carrollton, O., County Health Officer, Carroll County  
William C. Ellet, M.D., Department of Public Health, Benton Harbor, Mich., Director of Public Health  
Neil C. Geis, M.D., City Health Department, Casper, Wyo., City Health Officer  
Walter S. Holley, M.D., 2047 Calumet St., Toledo, O., Commissioner of Health  
Charles F. Nelson, M.D., Health Department, Beverly Hills, Calif., Health Officer  
William P. Parker, M.D., Davidson County Health Department, Nashville, Tenn., Assistant Health Officer  
H. H. Savage, M.D., City Health Department, Ogden, Utah, City Physician  
Lawrence J. Smith, M.D., Department of

Health, Warwick, R. I., Commissioner of Health

Harold P. Sullivan, M.D., 4751 Madison St., Chicago, Ill., Director of Health Service, Chicago Fire Department

Dr. Julio Vinięra, Jr., Avenida Morelos 32, Cuernavaca, Morelos, Mex., Director of Health

### *Public Health Engineering Section*

John A. Caraway, Health Department, Union City, Tenn., Sanitary Officer

John B. Gordon, District Building, Washington, D. C., Director of Sanitary Engineering, District of Columbia

Dr. Karl Imhoff, Ruhr Verband 37, Kronprinzen St., Essen, Germany, Sanitary Engineer (Assoc.)

Paul W. Mack, Metropolitan Water District, Manila, P. I., Manager and Chief Engineer  
C. H. Mock, Elizabethton, Tenn., Sanitary Inspector

James O. Myers, 906 Bigley Ave., Charleston, W. Va., Inspector, Kanawha County Health Unit

George G. Nasmith, Ph.D., 1130 Bay St., Toronto, Ont., Consulting Engineer  
L. R. Stockman, Box 635, Baker, Ore., Sanitary Engineer

#### *Laboratory Section*

Henri L. Berard, Ph.D., Provincial Dairy School, St. Hyacinthe, P. Que., Dairy Bacteriologist  
Hugh E. Eagan, 1418 15 St., Huntington, W. Va., Milk Inspector  
Lucille Watt, Box 268, Tuscaloosa, Ala., Director, Tuscaloosa Branch Laboratory

#### *Industrial Hygiene Section*

Katherine A. Rinis, 511 W. 186 St., New York, N. Y., Medical and Industrial Social Service

#### *Food and Nutrition Section*

Arthur K. Besley, Ph.D., 20 Monroe Ave., Riverdale, Md., Associate Bacteriologist, Bureau of Animal Industry, U. S. Dept. of Agriculture  
Gertrude S. Smith, 2694 University Ave., St. Paul, Minn., Acting Secretary, Twin City Unit, National Dairy Council

#### *Child Hygiene Section*

Marietta Catalano, M.D., 115 School St., Buffalo, N. Y., Assistant Medical School Examiner  
Pilar H. Lira, M.D., Apartado 679, Mexico, D. F., Mex., Director, Child Hygiene Division, Mexican Rural Health Service  
Charles E. McLean, M.D., 443 Sammon Ave., Toronto 6, Ont., Medical Officer of Health, Township of East York

#### *Public Health Education Section*

Lillian B. Davis, Sc.D., 1245 N. Broadway, Baltimore, Md., Supervisor of Health Education, Department of Education  
Florence J. Fiske, 440 S. Burdick St., Kalamazoo, Mich., Executive Secretary, Kalamazoo County Tuberculosis Assn.  
John H. Graves, M.D., 977 Valencia St., San Francisco, Calif., President, State Bd. of Health

Helen M. Hackett, R.N., 26 Lynde St., Boston, Mass., Consultant in Public Health Nursing, Dept. of Public Health  
J. B. Hock, R.N., 3612 North 17 St., Philadelphia, Pa. (Assoc.)  
Thomas T. McKinney, M.D., 2401 Emerson St., Denver, Colo., Medical Director, American Woodmen Society  
Alexander E. Nash, 140 W. Medical Bldg., Ann Arbor, Mich., Student (Assoc.)

#### *Public Health Nursing Section*

Ruth W. Hubbard, 1340 Lombard St., Philadelphia, Pa., Director, Visiting Nurse Society  
Margaret L. Jackson, 1409 Pennock Ave., Nashville, Tenn., Field Nurse, Davidson County Health Dept.  
Jane N. Laib, 3523 Wabash Ave., Baltimore, Md., Director, Bureau of Nursing, Health Dept.  
Mildred May, R.N., State Health Department, Nashville, Tenn., Public Health Nurse  
Caroline F. Reitz, R.N., R.D. No. 3, Brookville, Pa., Public School Nurse

#### *Epidemiology Section*

Rulx Leon, M.D., National Public Health Service, Port-au-Prince, Haiti, Director General  
Ralph E. Wheeler, M.D., U. S. Public Health Service, Ellicottville, N. Y., Epidemiologist

#### DECEASED MEMBERS

C. Hampson Jones, M.D., Baltimore, Md., Elected Member 1915, Fellow 1922  
Howard H. Bell, M.D., St. Louis, Mo., Elected Member 1928  
George H. Fox, M.D., Binghamton, N. Y., Elected Member 1920  
Walter T. Fuller, M.D., Dorchester, Mass., Elected Member 1920  
Edwin E. Hubbard, M.D., Dearborn, Mich., Elected Member 1929  
Arthur Kendrick, Brighton, Mass., Elected Member 1912  
Alma Taylor, R.N., Norwood, Mass., Elected Member 1921

#### ADDITIONAL APPLICANTS FOR FELLOWSHIP \*

HEALTH OFFICERS' SECTION—A. N. Crain, M.D., Phoenix, Ariz., William E. Donahoe, M.D., Sioux Falls, S. D., Peel M. Payne, M.D., Napoleonville, La.  
CHILD HYGIENE SECTION—Esther L. Richards, M.D., Baltimore, Md., Harold C. Stuart, M.D., Boston, Mass., Dorothy Worthington, M.D., White Plains, N. Y.

PUBLIC HEALTH EDUCATION SECTION—Melvin P. Isaminger, D.P.H., Corvallis, Ore.  
PUBLIC HEALTH NURSING SECTION—Mary J. Dunn, B.S., Nashville, Tenn.  
EPIDEMIOLOGY SECTION—Lee S. Huizenga, M.D., Jukao, Kiangsu, China.

\* See August JOURNAL, p. 847.

## NEW OFFICERS OF WESTERN BRANCH A.P.H.A.

DR. A. L. BEAGHLER was elected President of the Western Branch A.P.H.A. at the June meeting. He has been active in the affairs of the Western Branch for the past several years, and has been Vice-President for the past year. Dr. Beaghlér has been Director of Health Service for the Denver Public Schools since 1921, where he became nationally known in the field of school health work.

Dr. J. L. Pomeroy, Health Officer of Los Angeles County, became President-Elect.

Other officers elected were: *Vice-Presidents*—A. N. Crain, M.D., of Phoenix, Ariz.; Mrs. Saidie Orr-Dunbar, of Portland, Ore.; John J. Sippy, M.D., of Stockton, Calif. *Secretary*—W. P. Shepard, M.D., of San Francisco, Calif. *Treasurer*—W. F. Higby, of San Francisco, Calif.

## CONSTITUTIONAL CHANGES, WESTERN BRANCH

CERTAIN amendments have been made in the Constitution and By-Laws of the Western Branch. The following gives the present reading of the altered sections:

*Article IV (Constitution)**Officers*

The officers of the Western Branch, American Public Health Association, shall be Fellows of the Western Branch, American Public Health Association, and shall consist of a President, President-Elect, three Vice Presidents, a Secretary, and a Treasurer. The officers shall be elected by written ballot of the Active Members and Fellows present and voting at Annual Meeting as provided for in this article and in the By-Laws. The President-Elect shall serve as such from the close of the Annual Meeting at which he was elected to the close of the next Annual Meeting when he shall

automatically become President. As President he shall serve to the close of the next succeeding Annual Meeting. Officers shall serve from the close of the Annual Meeting when elected until the close of the next Annual Meeting; and all officers shall serve in any case until their successors are elected and qualified. A majority vote of those voting shall be required to elect, and if no candidate receives a majority vote on the first ballot, the candidate receiving the smallest number of votes shall be dropped after each ballot in succession until a majority vote is obtained.

*Article III (By-Laws)*

## (addition)

9. To appoint each year a representative on the Governing Council of the American Public Health Association, in accordance with Article III, Paragraph A, Item 6, of the Constitution of the American Public Health Association.

# PRELIMINARY PROGRAM OF THE SIXTY-FIRST ANNUAL MEETING

## AMERICAN PUBLIC HEALTH ASSOCIATION

*Washington, D. C., October 24-27, 1932*

THE Annual Meeting Program Committee presents the preliminary program of the scientific sessions of the Sixty-first Annual Meeting of the American Public Health Association and information concerning meetings of related organizations.

Scientific trips are listed on page 944. The next issue of the JOURNAL will give details regarding entertainment.

The complete program of the Institute on Health Education to be held October 22, 23, and 24, will be found on pages 971-972.

Since the following program cannot be considered definite in every respect now, delegates are urged to consult the Final Program, available at the Registration Desk in the Willard Hotel at the time of the meeting. All meetings, unless otherwise stated, will be held in the Willard Hotel.

*Monday, 9:30 A.M.*

### HEALTH OFFICERS

#### *First Session—Small Ball Room*

**Housing of Health Departments** (Report of the Committee on Business Management). I. F. THOMPSON, M.D., Commissioner of Health, Racine, Wis.

*Discussion.* ROBERT H. RILEY, M.D., State Commissioner of Health, Baltimore, Md., and JOHN P. KOEHLER, M.D., Commissioner of Health, Milwaukee, Wis.

**Vital Statistics and the Health Officer.** GEORGE B. L. ARNER, PH.D., Columbia University, New York, N. Y.

*Discussion.* SHIRLEY W. WYNNE, M.D., Commissioner of Health, New York, N. Y.

**Heart Disease and Public Health.** ALFRED E. COHN, M.D., The Hospital of the Rockefeller Institute for Medical Research, New York, N. Y.

*Discussion.* CHARLES F. WILINSKY, M.D., Deputy Commissioner, Child Hygiene Division, Department of Health, Boston. Mass.

**Getting Good Spirit in a Health Department Staff.** E. T. HANLEY, M.D., Seattle, Wash.

### VITAL STATISTICS

#### *First Session—Gridiron Room*

**Report of the Committee on Registration Affairs.** *Chairman,* T. F. MURPHY, M.D., Chief Statistician for Vital Statistics, Bureau of the Census, Washington, D. C.

*Monday, 9:30 A.M.*

## VITAL STATISTICS (Cont.)

### *First Session—Gridiron Room*

**The County Health Officer and Vital Statistics.** F. M. REGISTER, M.D., Director of Public Health, Goldsboro and Wayne County, Goldsboro, N. C.

**Precaution When Filing Deferred Certificates.** STEWART G. THOMPSON, D.P.H., Director, Division of Vital Statistics, State Board of Health, Jacksonville, Fla.

**The Occurrence, Physical Signs, and Significance of Pulmonic Systolic Murmurs in Adolescent Boys.** JEROME MEYERS, M.D., Department of Health, New York, N. Y.

**A Study of Resident Tuberculosis Mortality in New York State.** ELIZABETH PARKHURST, Senior Statistician, Division of Vital Statistics, State Department of Health, Albany, N. Y.

**Report of the Committee on Forms and Methods of Statistical Practice.** *Chairman,* A. W. HEDRICH, Sc.D., Associate in Biostatistics, School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Md.

## INDUSTRIAL HYGIENE

### *First Session—Cabinet Room*

**The Possibilities of Industrial Medical Service.** C.-E. A. WINSLOW, Dr.P.H., *Chairman*, Industrial Hygiene Section, Yale University, New Haven, Conn.

**Lead Poisoning Legislation.** FREDERICK L. HOFFMAN, LL.D., Prudential Insurance Company of America, Newark, N. J.

*Discussion.* SIR THOMAS OLIVER, Newcastle upon Tyne, England.

**Studies in Lead Excretion.** ROBERT KEHOE, M.D., College of Medicine, Cincinnati, O.

**Prevention of Lead Poisoning in Industry.** GEORGE H. GEHRMANN, M.D., Wilmington, Del.

**The Relative Susceptibility of Men and Women to Occupational Diseases.** CAREY P. MCCORD, M.D., Health Conservancy Laboratories, Cincinnati, O.

## CHILD HYGIENE

### *First Session—Large Ball Room*

#### *Research Session*

**Social and Economic Factors Influencing the Use of Preventive Medical Service for Preschool Children.** MAHEW DERRYBERRY, Research Assistant, Committee on Medical Care for Children, White House Conference on Child Health and Protection, New York, N. Y.

**A Suggested Method of Computing and Standardizing the Maternal Mortality Rate.** ROBERT J. LOWRIE, M.D., Adjunct Attending Obstetrician, Manhattan Maternity Hospital Dispensary, New York, N. Y.

**Sleep Patterns of Children.** SAMUEL RENSBAW, Ph.D., Associate Professor, Experimental Psychology, College of Education, Ohio State University, Columbus, O.

*Monday, 9:30 A.M.*

### CHILD HYGIENE (Cont.)

*First Session—Large Ball Room*

Some Outcomes from a Study of the Effects of School Health Programs on Children. RAYMOND FRANZEN, PH.D., Research Director, School Health Study, American Child Health Association, New York, N. Y.

*Monday, 12:15 P.M.*

### PUBLIC HEALTH EDUCATION

*Luncheon Session—Fairfax Room*

#### HEALTH BULLETINS

*Presiding:* BERTRAND BROWN, Director, Division of Publications, Milbank Memorial Fund, New York, N. Y.

What Health Departments Do About Health Education. JOHN HALL, American Public Health Association, New York, N. Y.

### PUBLIC HEALTH NURSING

*Luncheon Session—Rose Room, Washington Hotel*

*Monday, 2:30 P.M.*

### FOOD AND NUTRITION

*First Session—Cabinet Room*

Preservatives in Fruit Products. H. M. LANCASTER, Chief Dominion Analyst, Department of Pensions and National Health, Ottawa, Ont.

Dehydration of Foods. PROFESSOR SAMUEL C. PRESCOTT, Department of Biology and Public Health, Massachusetts Institute of Technology, Cambridge, Mass.

Health Value of Fruit Juice Beverages. WALTER H. EDDY, PH.D., Teachers College, Columbia University, New York, N. Y.

Nutritive Value of Cranberries. CARL R. FELLERS, PH.D., Massachusetts State College, Amherst, Mass.

Report of the Committee on Cereals and Their Products. *Chairman*, F. C. BLANCK, PH.D., U. S. Bureau of Chemistry and Soils, Washington, D. C.

Report of the Committee on Nutritional Problems. *Chairman*, PROFESSOR HENRY C. SHERMAN, Department of Chemistry, Columbia University, New York, N. Y.

The Bacterial Content of Frosted Hamburg Steak. LAWRENCE P. GEER, and ERNEST SMITH, Birdseye Laboratories, Gloucester, Mass.

A New Syndrome Produced by Oxidizing Fat in the Diet. DOROTHY V. WHIPPLE, M.D., Pediatric Department, University of Pennsylvania, Philadelphia, Pa.

*Monday, 2:30 P.M.*

## PUBLIC HEALTH NURSING

*First Session—Rose Room, Washington Hotel*

(Continuation of Luncheon Session)

**Childhood Tuberculosis.** EUGENE L. OPIE, M.D., The Henry Phipps Institute, Philadelphia, Pa.

### *Discussion:*

**Health Officer.** R. M. ATWATER, M.D., DR.P.H., Commissioner of Health, Cattaraugus County Health Department, Olean, N. Y.

**School Physician.** L. W. CHILDS, M.D., Supervisor, Health Service, Bureau of Physical Welfare, Board of Education, Cleveland, O.

**Public Health Nurse.** VIOLET HODGSON, R.N., Assistant Director, National Organization for Public Health Nursing, New York, N. Y.

### *General Discussion.*

## EPIDEMIOLOGY

*First Session—Sun Room, Washington Hotel*

**Epidemiological Methods in the Control of Syphilis and Gonorrhea.** WILLIAM MUNSON, M.D., State Department of Health, Albany, N. Y.

**Typhus-Spotted Fever in Maryland.** ROBERT H. RILEY, M.D., State Health Officer, and C. N. HALLIDAY, M.D., State Department of Health, Baltimore, Md.

**The Epidemiology of the Typhus-Spotted Fever Group in the Eastern Part of the United States.** A. RUMREICH, M.D., P. A. Surgeon, U. S. Public Health Service, Washington, D. C.

**The Neutralization of Poliomyelitis Virus by the Serum of Liberian Negroes.** N. PAUL HUDSON, M.D., and EDWIN H. LENNETTE, Department of Hygiene and Bacteriology, University of Chicago, Chicago, Ill.

**The Epidemiology of Complications of Smallpox Vaccination.** CHARLES E. ARMSTRONG, M.D., Surgeon, U. S. Public Health Service, Washington, D. C.

**An Analysis of New York State Typhoid Carrier Control.** HERMAN F. SENFTNER, M.D., DR.P.H., and FRANK E. COUGHLIN, M.D., DR.P.H., State Department of Health, Albany, N. Y.

## PUBLIC HEALTH EDUCATION

*First Session—Large Ball Room*

### HEALTH MOTIVATION

**What to Believe.** R. M. ATWATER, M.D., DR.P.H., Commissioner of Health, Cattaraugus County Health Department, Olean, N. Y.

**Principles of Motivation.** BENJAMIN C. GRUENBERG, New York, N. Y., and E. S. ROBINSON, M.D., PH.D., Professor of Psychology, Institute of Human Relations, Yale University, New Haven, Conn.



Monday, 2:30 P.M.

## LABORATORY

*Session 1A\*—Medical Sub-Session—Fairfax Room*

*Presiding:* ANNA W. WILLIAMS, M.D., *Vice-Chairman*, Laboratory Section.

*Section Business* (In Session 1B\*).

**A Study of Lobar Pneumonia in Massachusetts: Methods and Results of Pneumococcus Type Determination, 1931-1932.** RODERICK HEFFRON, M.D., and FLORENCE M. VARLEY, Pneumonia Study and Service, Department of Public Health, Boston, Mass.

**A Test for Reaction-Producing Substances in Concentrated Antipneumococcal Serum.** L. A. BARNES, PH.D., Antitoxin and Vaccine Laboratory, State Department of Public Health, Boston, Mass.

**A Test for the Value of Antipneumococcus Serum in Rabbits.** KENNETH GOODNER, PH.D., The Hospital of the Rockefeller Institute for Medical Research, New York, N. Y.

**An Experimental and Clinical Comparison Between Convalescent Serum and Non-Convalescent Serum in Poliomyelitis.** MAURICE BRODIE, M.D., Department of Bacteriology, McGill University, Montreal, Que.

**Properties of Blood Serums Reactivating Completely Neutralized Meningococcus Toxic Substances.** GREGORY SHWARTZMAN, M.D., Laboratories of the Mount Sinai Hospital, New York, N. Y.

**The Shwartzman Phenomenon: Factors Complicating Its Use in Testing Antimeningococcal Serums.** ANNA M. PABST and SARA E. BRANHAM, PH.D., National Institute of Health, Washington, D. C.

**Titration of the Neutralizing Potency of Antimeningococcus Serum by the Phenomenon of Local Skin Reactivity.** GRACE SICKLES, Division of Laboratories and Research, State Department of Health, Albany, N. Y.

## LABORATORY

*Session 1B\*—Sanitation Sub-Session—Gridiron Room*

### SYMPOSIUM ON STANDARD METHODS

*Presiding:* M. H. MCCRADY, *Chairman*, Laboratory Section.

*Section Business.*

**Some Proposed Procedures for the Presumptive Test in the Determination of the Coli-Aerogenes Group in Water.** C. T. BUTTERFIELD, U. S. Public Health Service, Cincinnati, O.

**Standardization of the Wassermann Test and Allied Procedures.** RUTH GILBERT, M.D., Division of Laboratories and Research, State Department of Health, Albany, N. Y.

**Report of the Committee on Standard Methods.** *Chairman*, R. G. PERKINS, M.D., Wakefield, R. I.

**Shellfish Analysis and the Problems Involved.** FREDERICK P. GORHAM, Brown University, Providence, R. I.

\* Session 1A—Medical Sub-Session in Fairfax Room, and Session 1B—Sanitation Sub-Session in Gridiron Room, meeting concurrently.

*Monday, 2:30 P.M.*

### LABORATORY (Cont.)

*Session 1B \*—Sanitation Sub-Section—Gridiron Room*

#### Standardization of Diagnostic Procedures and Reagents:

**The Bacteriology of the Intestinal Pathogens.** LEON C. HAVENS, M.D., State Department of Health, Montgomery, Ala.

**Agglutination in the Diagnosis of Enteric Disease.** RUTH GILBERT, M.D., and MARIAN B. COLEMAN, Division of Laboratories and Research, State Department of Health, Albany, N. Y.

**Standardization of Diagnostic Reagents.** JOHN F. NORTON, Ph.D., Department of Health, Detroit, Mich.

#### *Discussion.*

**Open Forum on Bacteriological Methods for Milk Analysis.** ROBERT S. BREED, Ph.D., New York State Agricultural Experiment Station, Geneva, N. Y.

*Discussion opened by* N. J. HOHL, Bureau of Milk Sanitation, State Department of Health, Albany, N. Y.

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\* Session 1A—Medical Sub-Session meeting concurrently in Fairfax Room.

### PUBLIC HEALTH ENGINEERING SECTION AND CONFERENCE OF STATE SANITARY ENGINEERS

*Joint Session—Small Ball Room*

**Report of the Joint Committee on Rural Sanitation.** *Chairman,* H. B. HOMMON, Sanitary Engineer, U. S. Public Health Service, San Francisco, Calif.

**Sanitation of Bathing Places** (Report of the Joint Committee on Swimming Pools and Bathing Places). *Chairman,* W. J. SCOTT, Director, Bureau of Sanitary Engineering, State Department of Health, Hartford, Conn.

**High Temperature—Short Time Pasteurization** (Combined Report from Conference Committee on Milk Sanitation and Section Committee on Milk Supply). *Chairman,* C. A. HOLMQUIST, Director, Division of Sanitation, State Department of Health, Albany, N. Y.

**Chemistry of Chlorination.** DR. FRANZ C. SCHMELKES, Assistant Director of Research, Wallace and Tiernan Company, Newark, N. J.

*Monday, 6:30 P.M.*

### PUBLIC HEALTH EDUCATION

*Dinner Session—Fairfax Room*

Closed session—for Fellows and members of the Section only.

*Section Business.*

*Monday, 8:00 P.M.*

## FIRST GENERAL SESSION

*Large Ball Room*

**Invocation.** RIGHT REVEREND JAMES E. FREEMAN, Bishop of Washington.

### Addresses of Welcome.

WILLIAM C. FOWLER, M.D., Health Officer of the District of Columbia, and Chairman of the Local Committee.

RAY LYMAN WILBUR, M.D., Secretary of the Interior.

DR. LUTHER H. REICHELDERFER, President, Board of Commissioners, District of Columbia.

### Address of the President of the American Public Health Association.

LOUIS I. DUBLIN, PH.D., Third Vice President and Statistician, Metropolitan Life Insurance Company, New York, N. Y.

*Reception and Dancing.*

*Tuesday, 9:30 A.M.*

## LABORATORY

*Session 2A\*—Medical Sub-Session—Fairfax Room*

**Presiding:** ANNA W. WILLIAMS, M.D., *Vice Chairman*, Laboratory Section.

### Laboratory Diagnosis of Tuberculosis Using Vitamin Deficient Animals.

JAMES STEVENS SIMMONS, M.D., Department of Bacteriology, U. S. Army Medical School, Washington, D. C.

**Study of Rocky Mountain Fever (Eastern Type) in Tennessee.** WILLIAM LITTERER, M.D., Division of Laboratories, State Department of Public Health, Nashville, Tenn.

**The Laboratory Diagnosis of Typhus Fever and Spotted Fever.** L. F. BADGER, M.D., National Institute of Health, Washington, D. C.

**A Bacteriological Study of Dysentery in Henrico County, Va.** G. FOARD MCGINNES, M.D., A. L. MACLEAN, M.D., and FORREST SPINDLE, State and County Departments of Health, Richmond, Va.

**Laboratory Diagnosis of Relapsing Fever and of Rat Bite Fever.** EDWARD FRANCIS, M.D., National Institute of Health, Washington, D. C.

**Laboratory Aids in the Diagnosis and Serum Therapy of Pneumococcus Pneumonia.** ALBERT B. SABIN, M.D., Department of Bacteriology and Immunology, New York University and Bellevue Hospital Medical College, New York, N. Y.

**Rheumatic Diseases and Sore Throat with Reference to Hemolytic Streptococci.** I. PILOT, M.D., and D. J. DAVIS, M.D., College of Medicine, University of Illinois, Chicago, Ill.

**The Adjustment of the Hydrogen Ion Concentration of Loeffler's Medium for the Diagnosis of Diphtheria.** C. A. STUART, PH.D., FREDERICK P. GORHAM, and R. M. PIKE, Biological Laboratory, Brown University, Providence, R. I.

**Value of Culture Tests in the Diagnosis of Diphtheria.** H. M. HATHFIELD, M.D., and A. G. MANN, Bureau of Laboratories, Department of Health, New York, N. Y.

\* Session 2B—Sanitation Sub-Session meeting concurrently in T-Room, Washington Hotel.

*Tuesday, 9:30 A.M.*

## LABORATORY

*Session 2B \*—Sanitation Sub-Session—T-Room, Washington Hotel*

*Presiding: M. H. McCrady, Chairman, Laboratory Section.*

**The Relation of the Actinic Intensity of Sunshine to Minimal Wave Length.**

GERALD L. HOEFT, and FRANCES DEYOUNG, Bureau of Laboratories and Research, Department of Health, Chicago, Ill.

**Certain Relationships of Leucocytes and Streptococci to Mastitis.** G. J.

HUCKER, PH.D., New York State Agricultural Experiment Station, Geneva, N. Y.

**Bacteriological Milk Analysis: New York State's Supplement to "Standard Methods."** F. L. SCHACHT, PH.D., and A. H. ROBERTSON, PH.D., State Department

of Agriculture and Markets, Albany, N. Y.

**Standard Methods of Examining Powdered Milk and Its Allied Products.**

P. S. PRICKETT, PH.D., Mead Johnson & Company, Evansville, Ind.

**A Study of Bacteriological Methods of Testing and Means of Disinfecting Water with Chlorine, with Particular Reference to Swimming Pool Water.**

W. L. MALLMANN, Department of Bacteriology, Engineering Experiment Station, Michigan State College, East Lansing, Mich., and WILLIAM H. CARY, JR., Department of Health, Detroit, Mich.

**The Treatment of Water by Colloidal Silver, Silver Nitrate, and Certain Silvered Materials.** JAMES GIBBARD, Laboratory of Hygiene, Department of

Pensions and National Health, Ottawa, Ont.

**Present Status of Handling Water Samples and Comparison of Bacteriological Analyses Under Varying Temperature and Holding Conditions with Special Reference to the Direct Method.** ELPREDA L. CALDWELL and LELAND

W. PARR, PH.D., Field Research Laboratory, State Department of Health, Andalusia, Ala.

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\* Session 2A—Medical Sub-Session meeting concurrently in Fairfax Room

## PUBLIC HEALTH ENGINEERING AND INDUSTRIAL HYGIENE SECTIONS

*Joint Session—Small Ball Room*

### SYMPOSIUM ON AIR HYGIENE

**Sunlight and Health.** HAVEN EMERSON, M.D., Department of Public Health Administration, Columbia University, New York, N. Y.

**Loss of Actinic Sunshine as a Health Problem of Cities.** FRED O. TONNEY, M.D., Assistant Commissioner in Charge of Research, Department of Health, Chicago, Ill.

**On the Bacterial Behavior of Air.** W. F. WELLS, Harvard Engineering School, Cambridge, Mass.

**Air Conditioning with Relation to Comfort, Health and Efficiency.** EMERY R. HAYHURST, M.D., PH.D., Consulting Industrial Hygienist, Columbus, O.

**The Scientific Basis of Ventilation Standards.** LEONARD GREENBURG, M.D., PH.D., Yale University, New Haven, Conn.

*Tuesday, 9:30 A.M.*

## CHILD HYGIENE AND PUBLIC HEALTH NURSING SECTIONS AND AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

*Joint Session—Large Ball Room, Gridiron Room, and Cabinet Room*

*Presiding:* WILLIAM A. HOWE, M.D., State Medical Inspector of Schools, and Secretary, American Association of School Physicians, Albany, N. Y.

Round Table Discussions

Three Separate Subjects Each in a Room

**Relative Merits of Three School Dental Programs as Outlined by Dr. Alfred Walker at the Montreal Meeting of the American Public Health Association.** *Group Leader.* GEORGE H. WANDEL, D.D.S., Supervisor, Bureau of Public Relations, American Dental Association, Chicago, Ill.

**The Functions of the School Physician, Nurse, Teacher, and Principal in a School Health Program.** *Group Leader.* HARRIET FULMER, R.N., Supervisor, Rural Nurses, Cook County, Chicago, Ill.

**Community Responsibility for Medical Service to Infants and Preschool Children.** *Group Leader.* DONALD B. ARMSTRONG, M.D., Third Vice President, Metropolitan Life Insurance Company, New York, N. Y.

*General Summary in Large Ball Room.*

## PUBLIC HEALTH EDUCATION

*Second Session—Rose Room, Washington Hotel*

### CLINIC ON PRINTED MATTER

**Clinician—**H. E. KLEINSCHMIDT, M.D., Director, Health Education, National Tuberculosis Association, New York, N. Y., assisted by RAYMOND S. PATTERSON, PH.D., Life Conservation Service, John Hancock Mutual Life Insurance Company, Boston, Mass.

*Tuesday, 12:15 P.M.*

## INDUSTRIAL HYGIENE

*Luncheon Session—Fairfax Room*

**Address.** SIR THOMAS OLIVER, Newcastle upon Tyne, England

**Reports of Committees.**

**Rehabilitation of the Industrial Disabled (*Motion Picture*).**

## CHILD HYGIENE

*Luncheon Session—Small Ball Room*

*Tuesday, 2:30 P.M.*

## VITAL STATISTICS

### *Second Session—Gridiron Room*

#### *Section Business.*

Report of the Committee on Registration of Births of Illegitimate and Adopted Children. *Chairman*, SHELDON L. HOWARD, State Registrar, State Department of Health, Springfield, Ill.

Public Health in Porto Rico. MANUEL A. PEREZ, Chief, Bureau of Vital Statistics, Department of Health, San Juan, P. R.

The Vital Statistics of the United States 1900-1930: A Preliminary Study. WALTER F. WILLCOX, PH.D., Professor of Economics and Statistics, Cornell University, Ithaca, N. Y.

A Study of Mortality by Census Tracts in Cincinnati. FLOYD P. ALLEN, M.D., Associate Secretary, Public Health Federation, Cincinnati, O.

A Code for Indexing Statistical Tables. A. W. HEDRICH, Sc.D., Associate in Biostatistics, School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Md.

Seasonal Distribution of Whooping Cough for Periods of High and Low Incidence. GATUS E. HARMON, M.D., Department of Hygiene and Bacteriology, School of Medicine, Western Reserve University, Cleveland, O.

## EPIDEMIOLOGY

### *Second Session—Fairfax Room*

A Study of 1300 Deaths from Measles. E. S. GODFREY, JR., M.D., Director, Division of Communicable Diseases, State Department of Health, Albany, N. Y.

Epidemic Influenza: A Comparison of Symptomatology as Observed in a Major and in a Minor Epidemic. J. A. DOULL, M.D., and ANNA BAHLKE, Department of Hygiene and Bacteriology, Western Reserve University, Cleveland, O.

Diphtheria Studies in Detroit. HENRY F. VAUGHAN, D.P.H., Commissioner of Health, and DON W. GUDAKUNST, M.D., Department of Health, Detroit, Mich.

The Risk of Persons in Familial Contact with Pulmonary Tuberculosis. W. H. FROST, M.D., School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Md.

The Results of a Survey of Trachoma Incidence in Tennessee and the Program of Accomplishment to Date. P. E. FAED, M.D., Trachoma Field Technician, State Department of Health, Nashville, Tenn., and C. E. RICE, M.D., P. A. Surgeon, Trachoma Prevention, U. S. Public Health Service, Rolla, Mo.

## MENTAL HYGIENE

### *Special Session—Large Ball Room*

*Presiding:* CHARLES F. WILINSKY, M.D., Deputy Commissioner, Child Hygiene Division, Department of Health, Boston, Mass.

Mental Health of the Preschool Child. IRA S. WILE, M.D., Assistant Pediatrician, Mount Sinai Hospital, New York, N. Y.

Mental Health of the School Child. ESTHER RICHARDS, M.D., Associate Professor of Psychiatry, Johns Hopkins Hospital, Baltimore, Md.

*Tuesday, 2:30 P.M.*

## MENTAL HYGIENE (Cont.)

*Special Session—Large Ball Room*

**Mental Health of the Adolescent.** WILLIAM A. WHITE, M.D., President, Institute of Mental Hygiene, Washington, D. C.

**Summarization.** CLARENCE M. HINCKS, M.D., General Director, National Committee for Mental Hygiene, New York, N. Y.

**The Aim and Accomplishments of a Health Center Mental Hygiene Program.** ELIZABETH ADAMSON, M.D., Psychiatrist, Bellevue-Yorkville Health Demonstration, New York, N. Y.

## PUBLIC HEALTH ENGINEERING

*First Session—Small Ball Room*

*Section Business.*

**Report of the Committee on Fellowship and Membership.** *Chairman,* LINN H. ENSLOW, Editor, *Water Works and Sewerage*, New York, N. Y.

**Report of the Committee on Public Health Engineering Manual.** *Chairman,* ARTHUR E. GORMAN, Engineer of Filtration, Department of Public Works, Chicago, Ill.

### SYMPOSIUM ON AIR HYGIENE (Continued)

**The Effects of Air Contaminants on the Natural Light of Cities.** H. B. MELLER, Head, and MARY E. WARGA, Industrial Fellow, Air Pollution Investigation, Mellon Institute of Industrial Research, Pittsburgh, Pa.

**Aerial Nuisances from the Refining and Burning of Petroleum Oils as a Public Health Problem.** STEPHEN DEM. GAGE, Consulting Engineer, Providence, R. I.

*Discussion.* EDWARD WRIGHT, Sanitary Engineer, State Department of Health, Boston, Mass.

**Smoke Abatement at Low Cost.** MORRIS M. COHN, Sanitary Engineer, Department of Public Works, Schenectady, N. Y.

**Noise and Its Relation to Health.** EDWARD F. BROWN, Director, Noise Abatement Commission, New York, N. Y.

**Progress Report of the Committee on Noise.** *Chairman,* C. R. COX, Assistant Sanitarian, State Department of Health, Albany, N. Y. (To be presented by title only.)

## FOOD AND NUTRITION

*Second Session—Cabinet Room*

**Report of the Committee on Fish and Shell Fish.** *Chairman,* ALBERT C. HUNTER, PH.D., U. S. Food and Drug Administration, Washington, D. C.

**The Vitamin Content of the Water Soluble Portion of Milk.** R. C. BENDER, PH.D., and GEORGE C. SUPPLEE, PH.D., Research Laboratories, The Dry Milk Company, Bainbridge, N. Y.

**Fumigation of Foodstuffs: Public Health Aspects of an Increasing Commercial Practice.** C. L. WILLIAMS, M.D., Senior Surgeon, U. S. Public Health Service, Washington, D. C.

**Metals and Their Relation to Public Health.** C. N. MYERS, M.D., and DINFORD THRONE, M.D., New York Skin and Cancer Hospital, New York, N. Y.

*Tuesday, 2:30 P.M.*

## FOOD AND NUTRITION (Cont.)

*Second Session—Cabinet Room*

**Health Hazards Involved in the Spraying of Fruits and Vegetables.** FREDERICK B. FLINN, PH.D., Associate Professor of Physiology, Columbia University, New York, N. Y.

**Report of the Committee on Meat and Meat Products.** *Chairman,* PAUL E. HOWE, PH.D., U. S. Bureau of Animal Industry, Washington, D. C.

**Comparative Nutritional Values of Oysters and Beef Liver and Other Dietary Supplements in Certain Dietary Deficiency States in Chickens.** H. D. PEASE, M.D., Pease Laboratories, New York, N. Y.

**Nutrition and the Present Economic Situation.** DR. LYDIA J. ROBERTS, *Chairman*, Department of Home Economics and Household Administration, University of Chicago, Chicago, Ill.

*Tuesday, 6:30 P.M.*

## PUBLIC HEALTH ENGINEERING

*Joint Dinner—Small Ball Room*

**Public Health Engineering Section and Conference of State Sanitary Engineers.** Annual Engineers' Stag Dinner Party.

## TRAINING AND PERSONNEL

*Dinner Session—Fairfax Room*

**Presiding:** CLAIR E. TURNER, DR.P.H., *Chairman*, Committee on Training and Personnel, Massachusetts Institute of Technology, Cambridge, Mass.

**The Current Work of the Committee.** CLAIR E. TURNER, DR.P.H.

**Possible Coöperation with the National Board of Medical Examiners.** W. S. LEATHERS, M.D., President, National Board of Medical Examiners, School of Medicine, Vanderbilt University, Nashville, Tenn.

**The Public Health Nursing Profession.** LILLIAN A. HUDSON, R.N., Department of Nursing Education, Teachers College, Columbia University, New York, N. Y.

**Professionalizing Public Health.** E. L. BISHOP, M.D., State Health Commissioner, Nashville, Tenn.

*Tuesday, 8:00 P.M.*

## MAINTAINING HEALTH EFFICIENCY IN TIMES OF DISTRESS

*Special Session—Large Ball Room*

A session devoted to a description of problems precipitated on health departments throughout the United States by the increased responsibilities and the reduced appropriations of a depression period, and how those problems have been met. No formal addresses. General discussion invited.

**Presiding:** LOUIS I. DUBLIN, PH.D., President, American Public Health Association, New York, N. Y.



Wednesday, 9:30 A.M.

## LABORATORY

*Session 3\*—Medical Sub-Session—Fairfax Room*

*Presiding:* M. H. McCrady, *Chairman*, Laboratory Section.

**The Clinical Value of the Presumptive Kahn Test.** TOMAS CAJIGAS, M.D., Clinical Pathological Laboratory, Washington, D. C.

**Choosing a Serum Test for Syphilis.** WILLIAM A. HINTON, M.D., Department of Clinical Research, Boston Dispensary and Wassermann Laboratory, State Department of Public Health, Boston, Mass.

**The Serology of Syphilis from the Standpoint of the Public Health Laboratory with Special Reference to Precipitation Methods.** JOHN A. KOLMER, M.D., DR.P.H., Department of Pathology and Bacteriology, Research Institute of Cutaneous Medicine, Temple University, Philadelphia, Pa.

**Recent Trends in Practical Luetic Serology and Their Relation to the Public Health Laboratory.** B. S. LEVINE, PH.D., Laboratory of Public Health Institute, Chicago, Ill. (To be presented by title only.)

**Some Observations on the Quantitative Kahn in the Various Stages of Syphilis.** JOHN M. McCANTS, M.D., Lieutenant Commander, Medical Corps, United States Navy, Norfolk Naval Hospital, Portsmouth, Va.

**The Agglutination Reaction in the Identification of Certain Pathogenic Funguses.** W. D. STOVALL, M.D., and ANNA BUBOLZ, State Laboratory of Hygiene, Madison, Wis.

**Yeast-like Funguses Found on the Skin and in the Intestines of Normal Individuals: A Survey of One Hundred Persons.** RHODA W. BENHAM, PH.D., Mycologist, Laboratory for Medical Mycology, College of Physicians and Surgeons, Columbia University, New York, N. Y.

**Necrobacillosis—A Clinical Entity.** FREDERICK W. SHAW, M.D., Department of Bacteriology and Clinical Pathology, Medical College of Virginia, Richmond, Va.

**The Effectiveness of Fungicides Upon Two Pathogenic Funguses.** CHESTER W. EMMONS, PH.D., Laboratory for Medical Mycology, College of Physicians and Surgeons, Columbia University, New York, N. Y.

## LABORATORY AND EPIDEMIOLOGY SECTIONS<sup>4</sup>

*Joint Session—Large Ball Room*

### SYMPOSIUM ON INCIDENCE, IDENTIFICATION AND SIGNIFICANCE OF BACTERIAL CARRIERS

*Presiding:* HAVEN EMERSON, M.D., *Chairman*, Epidemiology Section, and ANNA W. WILLIAMS, M.D., *Vice Chairman*, Laboratory Section.

**An Epidemiological Study of Diarrhea and Dysentery in Henrico County, Va.** G. FOARD MCGINNES, M.D., A. L. McLEAN, M.D., and FORREST SPINDLE, State and County Departments of Health, Richmond, Va.

**Hemolytic Streptococcus Antigens from Throats of Normal People Compared with Those from Beginning Pneumonias and Terminal Septicemias.** ANNA W. WILLIAMS, M.D., C. T. GURLEY, B. KULCHIN and N. STRYON, Bureau of Laboratories, Department of Health, New York, N. Y.

<sup>4</sup> Session 3—Medical Sub-Session, Laboratory Section, in Fairfax Room, and Joint Session of Laboratory and Epidemiology Sections in Large Ball Room, meeting concurrently.

Wednesday, 9:30 A.M.

## LABORATORY AND EPIDEMIOLOGY SECTIONS (Cont.)\*

*Joint Session—Large Ball Room*

**Epidemiological Significance of a Given Health Carrier Rate.** LLOYD AYCOCK, M.D., Department of Epidemiology, Harvard School of Public Health, Boston, Mass.

**Carriers in Whooping Cough.** TRAVIS P. BURROUGHS, M.D., Director, Bureau of Communicable Diseases, and EDMUND K. KLINE, D.P.H., Director of Laboratories, Cattaraugus County Department of Health, Olean, N. Y.

**Demonstration of Tubercle Bacilli in the Sputum, Feces, and Stomach Lavage of Suspected Tuberculous Children.** LUCY MISHULOW, Bureau of Laboratories, Department of Health, CAMILLE KERESZTURI, M.D., New York University Medical College, and DAVID HAUPTMAN, M.D., Department of Pediatrics, Sea View Hospital, New York, N. Y.

**Discussion.** WILLIAM H. PARK, M.D., Bureau of Laboratories, Department of Health, and BELA SCHICK, M.D., Pediatrician, Mount Sinai Hospital, New York, N. Y.

**Serological Diagnosis of Typhoid Carriers.** JOHN WYLLIE, D.P.H., Department of Preventive Medicine, Queen's University, Kingston, Ont.

**A Study of Typhoid Carriers.** LLOYD ARNOLD, M.D., Department of Bacteriology, University of Illinois, Chicago, Ill.

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\* Session 3—Medical Sub-Session, Laboratory Section, meeting concurrently in Fairfax Room.

## PUBLIC HEALTH ENGINEERING

*Second Session—Sun Room, Washington Hotel*

**The Sanitary and Economic Aspects of Municipal Cleansing.** GEORGE A. SOPER, Great Neck, N. Y.

**Street Cleaning in Washington.** T. L. COSTIGAN, Superintendent of Street Cleaning, City Refuse Department, Washington, D. C.

**Incineration in Washington.** H. P. EDDY, JR., Metcalf and Eddy, Boston, Mass., and J. B. GORDON, Director of Sanitary Engineering, Engineering Department, Washington, D. C.

**Garbage Reduction Methods.** H. H. MATTHIESON, Sanitary Engineer, Department of Health, Los Angeles, Calif.

**Discussion.** E. E. BUTTERFIELD, M.D., Consulting Chemist, Forest Hills, N. Y.

**Progress Report of the Committee on Industrial Plant Sanitation.** *Chairman,* F. G. LEGG, Sanitary Engineer, Department of Health, Detroit, Mich. (To be presented by title only.)

**Purification of Beet Sugar Wastes.** MAX LEVINE, Ph.D., Department of Bacteriology, Iowa State College, Ames, Ia.

## VITAL STATISTICS

*Third Session—Gridiron Room*

### SYMPOSIUM ON VITAL STATISTICS REGISTRATION PROBLEMS

*Wednesday, 9:30 A.M.*

## HEALTH OFFICERS

### *Second Session—Small Ball Room*

**Health in the Philippines.** M. A. DELANEY, M.D., Brigadier-General, Medical Department, Assistant Surgeon-General, War Department, Washington, D. C.

*Discussion.* DON L. GRISWOLD, M.D., Consulting Epidemiologist, State Department of Health, Albany, N. Y.

**The Set Up, Functioning, and Administration of a Bureau of Tuberculosis in a City of 160,000.** HERBERT R. EDWARDS, M.D., Director, Bureau of Tuberculosis, Department of Health, New Haven, Conn.

*Discussion.* ALTON S. POPE, M.D., Director, Division of Tuberculosis, State Department of Health, Boston, Mass., and HUNTINGTON WILLIAMS, M.D., Director, Department of Health, Baltimore, Md.

**Physical Examination of Domestic Employees.** CHARLES V. CRASTER, M.D., Health Officer, Newark, N. J.

*Discussion.* H. L. AKRIDGE, M.D., Health Officer, Glynn County, Brunswick, Ga., and D. L. RICHARDSON, M.D., Commissioner of Health, Providence, R. I.

**Health Centers.** KENNETH WIDDEMER, Executive Officer, East Harlem Health Center, New York, N. Y.

## INDUSTRIAL HYGIENE

### *Second Session—Cabinet Room*

**Studies in Employee Effectiveness at the Western Electric Company.** CLAIR E. TURNER, DR.P.H., Massachusetts Institute of Technology, Cambridge, Mass.

**The Appraisal Form for Industrial Health Service.** L. D. BRISTOL, M.D., Medical Director, American Telephone and Telegraph Company, New York, N. Y.

**A Comprehensive Program of Industrial Hygiene for State Departments of Labor and Health.** BERNARD S. COLEMAN, Newark, N. J.

**A Study Made of 2500 Girls in a Continuation School in New York City.** SOPHIE RABINOFF, M.D., Bureau of Industrial and Adult Hygiene, Department of Health, New York, N. Y.

**Industrial Dermatoses.** LOUIS SCHWARTZ, M.D., U. S. Bureau of Mines, Washington, D. C.

## CHILD HYGIENE

### *Second Session—Rose Room, Washington Hotel*

#### *(Special Studies and Business Meeting)*

**Infant Mortality Study in Denver.** A. D. H. KAPLAN, PH.D., Director, Social Studies, Bureau of Business and Social Research, University of Denver, Denver, Colo.

**Infant Mortality Study in Cleveland.** RICHARD A. BOLT, M.D., DR P.H., Director, Cleveland Child Health Association, Cleveland, O.

**Report of the Committee to Study and Report on the Problem of Infant and Maternal Mortality.** *Chairman,* JULIUS LEVY, M.D., Consultant in Child Hygiene, State Department of Health, Trenton, N. J.

*Wednesday 9:30 A.M.*

### CHILD HYGIENE (Cont.)

*Second Session—Rose Room, Washington Hotel*

**Report of the Committee to Study White House Conference Recommendations.**

*Chairman, HAROLD H. MITCHELL, M.D., Staff Associate, Division of Research, American Child Health Association, New York, N. Y.*

*Discussion.*

*Section Business.*

### PUBLIC HEALTH EDUCATION

*Third Session—Hall of Nations, Washington Hotel*

#### CLINIC ON RADIO BROADCASTING

Representative Programs of the Playlet, Dialogue, and Monologue Types  
will be broadcast and criticised.

**Playlet Type—**FLORENCE M. BAUER, assisted by W. W. BAUER, M.D., Director, Bureau of Health and Public Instruction, American Medical Association, Chicago, Ill.

**Dialogue Type—**JOHN L. RICE, M.D., Health Officer, and HERBERT F. HIRSCH, Executive Secretary, Cancer Control Committee, Department of Health, New Haven, Conn.

**Monologue Type—**HOWARD W. HAGGARD, M.D., Associate Professor of Applied Physiology, Yale University, New Haven, Conn.

**Critics:** W. W. PETER, M.D., DR.P.H., Cleanliness Institute, New York, N. Y., and PHILIP G. LOUCKS, Managing Director, National Association of Broadcasters, Washington, D. C.

*Wednesday, 12:15 P.M.*

### DIPHTHERIA PREVENTION

*Special Luncheon Session—Small Ball Room*

**Presiding:** GEORGE C. RUHLAND, M.D., Commissioner of Health, Syracuse, N. Y.

**Obstructions in the No-Diphtheria Path.** WILLIAM P. SHEPARD, M.D., Assistant Secretary, Metropolitan Life Insurance Company, San Francisco, Calif.

**Toxoid Versus Toxin-Antitoxin.** WILLIAM H. PARK, M.D., Bureau of Laboratories, Department of Health, New York, N. Y.

**Securing and Continuing Records of Immunizations Performed.** EDWARD S. GODFREY, JR., M.D., Director, Division of Communicable Diseases, State Department of Health, Albany, N. Y.

**How State-wide Voluntary Health Associations Can Assist Official Agencies in Eradicating Diphtheria.** GEORGE J. NELBACH, Executive Secretary, State Committee on Tuberculosis and Public Health, New York, N. Y.

*Discussion.* HENRY F. VAUGHAN, D.P.H., Commissioner of Health, Detroit, Mich.

*Wednesday, 12:15 P.M.*

## FOOD AND NUTRITION

*Luncheon Session—Fairfax Room*

Address. CLYDE B. SCHUMAN, American Red Cross, Washington, D. C.

*Section Business.*

*Wednesday, 2:30 P.M.*

## PUBLIC HEALTH TEN STAR FINAL

*Special Session—Large Ball Room*

(A Symposium on the Current Work of the Ten Sections)

*Presiding:* MAZŮCK P. RAVENEL, M.D., University of Missouri, Columbia, Mo.

Address by the Presiding Officer.

**Laboratory Section**—GEORGE W. MCCOY, M.D., Director, National Institute of Health, Washington, D. C.

**Health Officers Section**—HUNTINGTON WILLIAMS, M.D., Director, Department of Health, Baltimore, Md.

**Vital Statistics Section**—EDWIN W. KOPF, Metropolitan Life Insurance Company, New York, N. Y.

**Public Health Engineering Section**—ABEL WOLMAN, Chief Engineer, State Department of Health, Baltimore, Md.

**Industrial Hygiene Section**—ALICE HAMILTON, M.D., Assistant Professor, Industrial Medicine, Harvard School of Public Health, Boston, Mass.

**Food and Nutrition Section**—PROFESSOR HENRY C. SHERMAN, Department of Chemistry, Columbia University, New York, N. Y.

**Child Hygiene Section**—JAMES F. ROGERS, M.D., Consultant in Hygiene and Specialist in Health Education, U. S. Department of the Interior, Washington, D. C.

**Public Health Education Section**—JAGO GALDSTON, M.D., Director, Medical Information Bureau, New York Academy of Medicine, New York, N. Y.

**Public Health Nursing Section**—HELEN LAMALLE, R.N., Superintendent of Nursing Service, Metropolitan Life Insurance Company, New York, N. Y.

**Epidemiology Section**—HAVEN EMERSON, M.D., Department of Public Health Administration, Columbia University, New York, N. Y.

*Wednesday, 8:00 P.M.*

## SECOND GENERAL SESSION

*Banquet—Large Ball Room*

Announcement of Awards.

The Western Branch, American Public Health Association. WILLIAM P. SHEPARD, M.D., Secretary, Western Branch, American Public Health Association, San Francisco, Calif.

*Dancing.*

*Thursday, 9:30 A.M.*

## LABORATORY

*Session 4A\*—Medical Sub-Session—Gridiron Room*

### SYMPOSIUM ON BACTERIAL DISSOCIATION

*Presiding:* RUTH GILBERT, M.D., Division of Laboratories and Research, State Department of Health, Albany, N. Y.

*Section Business.*

**The Dissociation of Bacterium Typhosus in Its Relation to the Production of Anti-typhoid Vaccine.** FRANCIS B. GRINNELL, M.D., Department of Bacteriology and Immunology, Harvard University Medical School, Boston, Mass.

**Some Variants of Bacillus Megatherium.** GEORGES KNAYSI, PH.D., Department of Dairy Industry, Cornell University, Ithaca, N. Y.

**A Study of the Reversion of Rough Variants.** G. M. MACKENZIE, M.D., VERNAL IRONS, PH.D., and HELEN FITZGERALD, The Mary Imogene Bassett Hospital, Coopers-town, N. Y.

**Dissociation of the Large Fusiform Bacillus.** DAVID T. SMITH, M.D., Duke University, Durham, N. C.

**Study of Variation in Erysipelas Strains.** SOPHIE SPICER, M.D., Bureau of Laboratories, Department of Health, New York, N. Y.

*Discussion.* STANHOPE BAYNE-JONES, M.D., School of Medicine and Dentistry, University of Rochester, Rochester, N. Y., and R. R. SPENCER, M.D., Surgeon, National Institute of Health, Washington, D. C.

**Parasitology in Relation to Public Health.** MAURICE C. HALL, PH.D., Zoological Division, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

**The Advantages of Photo-Electric Over Visual Measurements as Exemplified by the Photo-Electric Scopometer.** WILLIAM G. EXTON, M.D., Laboratory and Longevity Service, The Prudential Insurance Company of America, Newark, N. J.

## LABORATORY

*Session 4B\*—Medical Sub-Session—T-Room, Washington Hotel*

*Presiding:* M. H. MCCRADY, Chairman, Laboratory Section.

*Section Business.* (In Session 4A\*)

**The Antigenic Value of Commercial Diphtheria Toxoids.** WILLIAM LEVIN, DR.P.H., Hygienic Laboratory, State Board of Health, and HELEN A. CARY, M.D., Medical Director, City Schools, Portland, Ore.

**Comparative Evaluation of Diphtheria Toxoid Preparations and Methods of Immunization.** JOHN D. MONROE, M.D., and V. K. VOLK, M.D., Oakland County Department of Health, Pontiac, Mich.

**The Effect of Tonsillectomy on the Schick Test and Dick Test.** WILLIAM H. PARK, M.D., Bureau of Laboratories, Department of Health, CAMILLE KERESZTURI, M.D., New York University Medical College, and OSCAR RIMSON, M.D., Fifth Avenue Hospital, New York, N. Y.

*Discussion.* BELA SCHICK, M.D., Pediatrician, Mount Sinai Hospital, New York, N. Y.

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\* Session 4A—Medical Sub-Session in Gridiron Room, and Session 4B—Medical Sub-Session in T-Room, Washington Hotel, meeting concurrently.

Thursday, 9:30 A.M.

### LABORATORY (Cont.)

*Session 4B \*—Medical Sub-Section—T-Room, Washington Hotel*

**The Use of Concentrated Toxoid in Immunization Against Diphtheria.**  
WILLIAM EDWARD BUNNEY, PH.D., Bureau of Laboratories, State Department of Health, Lansing, Mich.

**Studies on Bacterial Activity in Various Levels of the Intestines of Monkeys and Dogs.** G. M. DACK, and ELIZABETH PETRAN, Department of Hygiene and Bacteriology, University of Chicago, Chicago, Ill.

**The Portals of Entry of Brucella Abortus in Guinea Pigs.** C. L. EVERSON, D.V.M., L. J. POELMA, D.V.M., A. L. BRUECKNER, V.M.D., and E. M. PICKENS, D.V.M., Department of Bacteriology and Pathology, University of Maryland, College Park, Md.

**A Study of Opsono-Cytophagic Activity of the Blood in Brucella Infection and Immunity in Man.** I. FOREST HUDDLESON, D.V.M., and HOWARD W. JOHNSON, D.V.M., Central Brucella Station, Michigan State Experiment Station, East Lansing, Mich.

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\* Session 4A—Medical Sub-Session meeting concurrently in Gridiron Room.

## HEALTH OFFICERS AND PUBLIC HEALTH NURSING SECTIONS

*Joint Session—Large Ball Room*

### ADMINISTRATION OF PUBLIC HEALTH NURSING WORK AND THE RELATIONSHIP BETWEEN HEALTH OFFICER AND NURSE

*Presiding: Chairman Health Officers Section, GEORGE C. RUHLAND, M.D., Commissioner of Health, Syracuse, N. Y., and Chairman Public Health Nursing Section, HELEN LAMALLE, R.N., Superintendent of Nursing Service, Metropolitan Life Insurance Company, New York, N. Y.*

**Points of View of a Health Officer.** JACOB C. GEIGER, M.D., Health Officer, San Francisco, Calif.

**Points of View of a Supervisor of Nurses.** MARION W. SHEAHAN, Director, Division of Public Health Nursing, State Department of Health, Albany, N. Y.

**Points of View of a Bureau Chief.** DON W. GUDAKUNST, M.D., Director, School Health Service, Department of Health, Detroit, Mich.

**Points of View of a Field Nurse.** MARGARET D. WESTBROOK, City Nurse, Ogdensburg, N. Y.

## PUBLIC HEALTH ENGINEERING

*Third Session—Fairfax Room*

**Public Health Engineering Functions of City Health Departments (Report of the Committee on Record Forms).** *Chairman, I. W. MENDELSON, Washington, D. C.*

**Chlorine in Sewage Disposal (Report of the Committee on Sewage Disposal).** *Chairman, LANGDON PEARSE, Sanitary Engineer, Sanitary District of Chicago, Chicago, Ill.*

*Thursday, 9:30 A.M.*

## PUBLIC HEALTH ENGINEERING (Cont.)

*Third Session—Fairfax Room*

The Romance of the "Specialist" (Report of the Committee on Promotion of Environmental Sanitation). *Chairman*, V. M. EHLERS, Chief Sanitary Engineer, State Department of Health, Austin, Tex.

Taste and Odor Removal Processes (Report of the Committee on Water Supply). *Chairman*, J. R. BAYLIS, Physical Chemist, Department of Public Works, Chicago, Ill.

Occurrences of Fluorine in Water (Report of the Sub-Committee on Ground Water). *Sub-Chairman*, W. S. JOHNSON, State Board of Health, Jefferson City, Mo.

The Application of the Principles of Water Purification to Swimming Pool Control Programs. A. H. FLETCHER, Sanitary Engineer, Department of Health, Memphis, Tenn., and A. E. CLARK, Associate Sanitary Engineer, State Department of Health, Nashville, Tenn.

Progress Report of the Committee on Waterways Pollution. *Secretary*, L. F. WARRICK, State Sanitary Engineer, State Board of Health, Madison, Wis. (To be presented by title only.)

## PUBLIC HEALTH EDUCATION

*Fourth Session—Small Ball Room*

### PARTICIPATION OF THE MEDICAL PROFESSION IN HEALTH EDUCATION

HENRY F. VAUGHAN, D.P.H., Commissioner of Health, Detroit, Mich.

W. W. BAUER, M.D., Director, Bureau of Health and Public Instruction, American Medical Association, Chicago, Ill.

W. S. LEATHERS, M.D., School of Medicine, Vanderbilt University, Nashville, Tenn.

RAYMOND H. GREENMAN, Executive Secretary, Tuberculosis and Health Association, Rochester, N. Y.

*Discussion Leader.* IRA V. HISCOCK, Professor of Public Health, Yale University, New Haven, Conn.

## INDUSTRIAL HYGIENE SECTION AND AMERICAN SOCIAL HYGIENE ASSOCIATION

*Joint Session—Sun Room, Washington Hotel*

### SYPHILIS: AN INDUSTRIAL PROBLEM

*Presiding:* C.-E. A. WINSLOW, DR.P.H., Yale University, New Haven, Conn.

Losses and Risks to Industry Attributable to Syphilis. J. R. GARNER, M.D., Chief Surgeon, Atlanta and West Point Railroad Company, the Western Railway of Alabama, Georgia Railroad, Atlanta, Ga.

Should the Treatment of Syphilis Be Included Under the Medical Benefit Arrangement of Industries? C. H. KIBBEY, M.D., Director of Sanitation, Tennessee Coal, Iron and Railroad Company, Fairfield, Ala.



*Thursday, 9:30 A.M.*

# INDUSTRIAL HYGIENE SECTION AND AMERICAN SOCIAL HYGIENE ASSOCIATION (Cont.)

*Joint Session—Sun Room, Washington Hotel*

A General Plan for the Prevention and Treatment of Syphilis in Large Industries. WILLIAM F. SNOW, M.D., General Director, American Social Hygiene Association, New York, N. Y.

*Thursday, 12:15 P.M.*

# PUBLIC HEALTH EDUCATION

*Luncheon Session—Small Ball Room*

Presiding: IAGO GALDSTON, M.D., Director, Medical Information Bureau, Academy of Medicine, New York, N. Y.

Mopping Up. *Informal Discussion.*

*Thursday, 2:30 P.M.*

# FOOD AND NUTRITION

*Third Session—Fairfax Room*

Report of the Committee on Milk and Dairy Products. *Chairman*, WILLIAM B PALMER, Milk Inspection Association of the Oranges, Orange, N. J.

Further Studies on the Growth of *Cl. botulinum* in Defrosted Peas. R. P STRAKA and LAWRENCE H. JAMES, PH.D., Food Research Division, U. S. Bureau of Chemistry and Soils, Washington, D. C.

Report of the Committee on Fruits and Vegetables. *Chairman*, WALTER H EDDY, PH.D., Teachers College, Columbia University, New York, N. Y.

# SYMPOSIUM ON MILKS OF SPECIAL ANTIRACHITIC VALUE THEIR DEVELOPMENT AND USE

Opened by PROFESSOR HENRY C. SHERMAN, Department of Chemistry, Columbia University, New York, N. Y.

Antirachitic Activation of Milk by Direct Irradiation with Ultra-Violet Rays. GEORGE C. SUPPLEE, PH.D., Director of Research, The Dry Milk Company, Bainbridge, N. Y.

The Addition of Vitamin Concentrates to Milk. THEODORE F. ZUKER, PH.D., Assistant Professor of Pathology, Columbia University, New York, N. Y.

A Preliminary Report upon the Protective Value for Infants of Various Types of Vitamin D Fortified Milk as Compared with Protective and Curative Experiments in Rats. JOHN M. McK. MITCHELL, M.D., JOSEPH STOKES, JR., M.D., DOROTHY V. WHIPPLE, M.D., Pediatric Department, and JOHN EIMAN, M.D., Associate Pathologist, Medical School, University of Pennsylvania, Philadelphia, Pa.

The Rôle of Activated Milks in the Anti-Rickets Campaign. ALFRED F. HESS, M.D., New York, N. Y.

*Thursday, 2:30 P.M.*

## VITAL STATISTICS

### *Fourth Session—Gridiron Room*

Report of the Committee on Proper Allocation of Records. *Chairman*, J. V. DEPORTE, PH.D., Director, Division of Vital Statistics, State Department of Health, Albany, N. Y.

Biometric Studies on United States Army Officers: Somatological Norms in Disease. LOWELL J. REED, PH.D., Department of Biostatistics, School of Hygiene and Public Health, Johns Hopkins University, Baltimore, Md.

*Discussion.* J. V. DEPORTE, PH.D., Director, Division of Vital Statistics, State Department of Health, Albany, N. Y.

More Uniformity and Reliability in Records. HAROLD B. WOOD, M.D., Epidemiologist, Department of Health, Harrisburg, Pa.

An Original Method of Computing the Probable Approximate Number of Chronic Typhoid Carriers in the State of Maine. WILLIAM L. HOLT, M.D., Director, Division of Communicable Diseases, Department of Health and Welfare, Augusta, Me.

Report of the Committee to Coöperate with the National Safety Council in Preparing Forms for Additional Information Regarding Accidents. *Chairman*, W. THURBER FALES, Sc.D., State Registrar, State Board of Health, Montgomery, Ala.

## CHILD HYGIENE

### *Third Session—Small Ball Room*

#### NEW AND INTERESTING DEVELOPMENTS IN THE CHILD HEALTH FIELD

Estimation of the Effectiveness of Child Health Programs in Ontario by Survey Methods. JOHN T. PHAIR, M.B., D.P.H., Director, Division of Child Hygiene, Provincial Department of Health, Toronto, Ont.

A Report on Handwashing Facilities in Public Schools. SALLY LUCAS JEAN, Health Consultant, New York, N. Y.

A Plan for Promoting More Accurate Records of Infant Hygiene Work. C. A. SARGENT, M.D., Director, Division of Child Hygiene, State Board of Health, Dover, Del.

Practical Parental Education. ROSAMOND PRAEGER, R.N., Supervisor, Child Development and Parental Education, Board of Education, Syracuse, N. Y.

The Part the Laity Plays in a Rural Child Health Program. ELMA ROOD, R.N., Director of Health Education, Children's Fund of Michigan, Detroit, Mich.

The Denver Plan of Parental Education. JESSIE I. LUMMIS, Executive Secretary, Denver Tuberculosis Society, Denver, Colo.

*Announcement.* LOUISE STRACHAN, Director, Child Health Education, National Tuberculosis Association, New York, N. Y.

## INDUSTRIAL HYGIENE

### *Third Session—Cabinet Room*

In Re Silicosis. JACOB GOLDBERG, PH.D., New York Tuberculosis and Health Association, New York, N. Y.

*Thursday, 2:30 P.M.*

## INDUSTRIAL HYGIENE (Cont.)

### *Third Session—Cabinet Room*

**Toxicity of Organic Fluorides.** WILLIAM P. YANT, M.D., U. S. Bureau of Mines, Pittsburgh, Pa.

**Experimental Data in Acute Silicosis.** RALPH POMERANZ, M.D., Radiologist, Tuberculosis Division, Department of Health, Newark, N. J.

**Pathology Attending Asphyxia from Carbon Monoxide and Atmospheres Deficient in Oxygen.** R. R. SAYERS, M.D., U. S. Bureau of Mines, Washington, D. C.

**The Effect of Talc on Workers.** W. C. DREESSEN, M.D., Assistant Surgeon, U. S. Public Health Service, Washington, D. C.

## INSTITUTE ON HEALTH EDUCATION

### Under the Auspices of the Public Health Education Section

The purpose of the Institute is to provide instruction in the content and methodology of Health Education to a limited number of persons actively engaged in Health Education.

Active Health Education workers in official departments of health—state, county and city—and in voluntary agencies are invited to enroll.

Health officers and directors of health organizations are urged to send to the Institute the individuals responsible for Health Education activities in their units.

The registration fee is \$5.00. Write the Association office for enrollment blanks.

*Saturday, October 22, 9.00 A.M.—12.00*

### HEALTH EDUCATION INSTRUMENTS

Discussion of the instruments employed in Health Education; pamphlets, weekly and monthly publications and bulletins, charts, posters, health talks and radio talks; their special utility and their limitations.

*Discussion Leader:* EVART G. ROUTZAHN, Russell Sage Foundation, New York, N. Y.

*Discussers:* BERTRAND BROWN, Director, Division of Publications, Milbank Memorial Fund, New York, N. Y., and W. W. PETER, M.D., Cleanliness Institute, New York, N. Y.

*Saturday, October 22, 2.00 P.M.—5.00 P.M.*

### SOURCES OF INFORMATION

The responsibility of the health educator for the authenticity of his material. How to go about securing dependable information to present on the items selected, to the indicated audiences, and through the preferred mediums. Tapping authoritative sources. The coöperation of the medical profession.

## INSTITUTE ON HEALTH EDUCATION (Cont.)

*Saturday, October 22, 2.00 P.M.—5.00 P.M.*

## SOURCES OF INFORMATION

*Discussion Leader:* IRA V. HISCOCK, Yale University, New Haven, Conn.*Discusser:* CLAIR E. TURNER, DR.P.H., Massachusetts Institute of Technology, Cambridge, Mass.*Sunday, October 23, 9.00 A.M.—12.00*

## BUILDING PROGRAMS

How to formulate a program of Health Education suitable to the community. How to determine the allocation of staff, money and effort. This problem will be considered from the viewpoint of both the official agency, that is, the department of health, and of the voluntary agencies.

*Discussion Leader:* RAYMOND H. PATTERSON, PH.D., Life Conservation Service, John Hancock Mutual Life Insurance Company, Boston, Mass.*Discusser:* IRA V. HISCOCK, Yale University, New Haven, Conn.*Monday, October 24, 9.00 A.M.—12.00*

## PROGRAM EXECUTION

The avenues through which the program might be formulated; the population at large, special groups, schools, primary and secondary, teacher training organizations, work shops and work places, commercial organizations, etc.

*Discussion Leader:* W. W. BAUER, M.D., Director, Bureau of Health and Public Instruction, American Medical Association, Chicago, Ill.*Discussers:* GEORGE C. RUHLAND, M.D., Commissioner of Health, Syracuse, N. Y., and EVART G. ROUTZAHN, Russell Sage Foundation, New York, N. Y.

A question period will be arranged for at the end of each discussion though the participants in the Institute will be privileged to interrupt the discussor with pertinent questions.

## MEETINGS OF OTHER ORGANIZATIONS

## AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

All meetings will be held in the Washington Hotel.

Friday A.M., October 21. Joint Session with the International Society of Medical Health Officers.

Friday P.M. Individual Session.

Saturday A.M., October 22. Joint Session with the International Society of Medical Health Officers.

Saturday P.M. Individual Session.

Saturday Evening. Business Meeting.

Sunday-Evening, October 23. Dinner Session. Joint with the International Society of Medical Health Officers.

## AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

Tuesday A.M., October 25. Joint Session with Child Hygiene and Public Health Nursing Sections.

## INTERNATIONAL SOCIETY OF MEDICAL HEALTH OFFICERS

All meetings will be held in the Washington Hotel

Friday A.M., October 21. Joint Session with the American Association of School Physicians.

Saturday A.M., October 22. Joint Session with the American Association of School Physicians.

Sunday Evening, October 23. Dinner Session. Joint with the American Association of School Physicians.

Business Meeting.

## CONFERENCE OF STATE SANITARY ENGINEERS

All day Saturday, October 22, Fairfax Room.

Monday A.M. Individual Session, Fairfax Room.

Monday P.M. Joint Session with the Public Health Engineering Section, Small Ball Room.

Tuesday. Annual Engineers' Stag Dinner Party, Small Ball Room.

## STATE LABORATORY DIRECTORS' CONFERENCE

Sunday, October 23. Luncheon to be followed by an afternoon program of round table discussions of questions pertaining to the administration of state laboratories, Gridiron Room.

(Limited to Directors of State Health Department Laboratories, State Branch Laboratories and their Principal Assistants.)

## ASSOCIATION OF WOMEN IN PUBLIC HEALTH

Monday Evening. Dinner Session, Cabinet Room.

## DELTA OMEGA

Tuesday. Luncheon Session, Gridiron Room.

EXECUTIVE COMMITTEE, HEALTH DIVISION,  
NATIONAL CONFERENCE OF SOCIAL WORK

Thursday. Luncheon Session, Committee Room.

## HEALTH COUNCIL EXECUTIVES

Wednesday. Luncheon Session, Gridiron Room.

## AMERICAN SOCIAL HYGIENE ASSOCIATION

Thursday, Friday and Saturday, October 27, 28, and 29. Social Hygiene Regional Conference.

Thursday P.M. Joint Session with Industrial Hygiene Section, Sun Room, Washington Hotel.

NATIONAL SHELL FISHERIES ASSOCIATION AND OYSTER  
GROWERS AND DEALERS ASSOCIATION OF  
NORTH AMERICA, INC.

Friday and Saturday, October 28 and 29. All day, Fairfax Room.

## Biology

Sex Cycles in Oysters.

Chemical Influences upon Spawning.

Artificial Control of Oyster Reproduction.

## Food and Nutrition of Shellfish

Plankton Foods.

Mineral Requirements.

Vitamin Potencies in Oyster Foods.

Greening and Other Colorations in Oysters from Physiological and Chemical Standpoints.

## Food and Nutritive Values

Human Nutritional Values of Shellfish, Especially Oysters.

Chemical Characteristics of Oyster Tissues with Respect to Carbohydrates (Glycogen), Proteins and Fats.

Mineral Values in Oysters.

Prevention and Correction of Nutritional Anemias.

Iodine in Animal Metabolic Processes and the Value of Iodine in Shellfish.

Vitamins and Other Special Nutritive Values in Shellfish, Especially Oysters, for the Prevention of Food Deficiencies and Protection Against Toxic Food Conditions.

## Food Processes and Packaging

Packaging and Preservative Processing of Shellfish, Including Heat Treatment, Quick Freezing, etc.

## Hygienic Supervision

Sanitation of Industrial Shellfish Activities, Including Field Methods, Laboratory Investigational Procedures.

## LETTER FROM GREAT BRITAIN

THE ROYAL SANITARY INSTITUTE  
HEALTH CONGRESS

THE congress of the Royal Sanitary Institute, the most important of the several health congresses held annually in Great Britain, concluded its deliberations after a full week on Saturday, July 16. The forty-third of the series, the meeting on this occasion was held at Brighton on the invitation of the Mayor and Corporation of the town. From every point of view the congress may be claimed to have scored a success. Certainly it was a most enjoyable meeting, and the considerable amount of work set down to be done was tackled and carried through with the right spirit of cheerfulness and enthusiasm. The total attendance numbered just under 1,400, a figure which, while rather less than that for last year, is rather over the average of recent years.

Among representatives from countries other than Great Britain and the overseas dominions, it was a great pleasure to find a sizeable contingent from the United States of America in the persons of Dr. W. C. Billings, Medical Director at American Consulate General, London; Past Asst. Surgeon F. J. Halpin of the Consulate in Southampton; and Dr. Blanche Sterling of Washington—all of the U. S. Public Health Service; and Dr. Josephine Baker, well known pediatricist. James L. Tighe represented, as he has done before, the Massachusetts State Board of Health; and Professor Winslow filled the dual rôle of representative of the American Public Health Association and Yale University. Professor Sundwall, of the University of Michigan, who, in all innocence, had visited London for the purpose, I imagine, of looking at the School of Hygiene

and such like activities, also found himself making part of the congress and sharing in the work and several of the discussions.

As a humble—and Honorary—Fellow of the American Public Health Association, indeed, it affords me considerable gratification to be in a position to record that members of that body in several spheres made contributions of real moment to the proceedings. At the inaugural meeting, Dr. Billings, acting as spokesman of the representatives from abroad, in a graceful speech voiced congratulation and expressed thanks to the President of the congress (Lord Leconfield, Lord Lieutenant of Sussex and Chairman of the County Council) for his address. Professor Winslow and Professor Sundwall both took part in discussions at the Preventive Medicine and other sections. The former, in addition, delivered what is called “the lecture to the congress,” and by his peroration to an address on “Current Tendencies in American Public Health” evoked an enthusiasm of an intensity definitely astonishing on the part of a people commonly regarded as equally devoid of both enthusiasm and sense of humor.

As the congress met in some twelve sections and conferences, the number of subjects discussed was considerable. Also there was no lack of variety, great thoughts on bed-bugs calling forth opinions no less helpful and profound than those expressed with regard to such problems as the prevention of cancer, the medical treatment of the sick poor, the necessity for birth control, and the advisability of repealing the laws relating to compulsory vaccination. These subjects were dealt with in sections or at conferences in which medical officers of

health particularly were concerned and interested, and some of them proved so attractive—birth control and vaccination, for example—that attendances of round about 400 were secured and even standing room was 'unobtainable. So far as conclusions are concerned, in the case of birth control and vaccination, at any rate, it seemed pretty definite that there was a determination that the time had arrived for doing something about them. Among communications received at the congress it is perhaps worth noting that the message from the Minister of Health was particularly encouraging. His suggestion that the watchword of the congress should be "the efficient maintenance of essential services with a thorough elimination of all unnecessary or wasteful expenditure" was not regarded as foreshadowing anything drastic in the shape of cuts.

#### THE MINISTRY OF HEALTH REPORT

THE report of the Ministry of Health, which made its appearance the other day, is a survey of the whole work of the department. Though it deals fairly fully with purely health questions, for the reason that the Chief Medical Officer (Sir George Newman) himself publishes a separate report, the discussion of this aspect of the Ministry's activities is less complete than it might be.

Sanitary administration, housing and town planning, local finance, administration of the poor law, national health insurance, and contributory pensions, etc., all receive attention, and a vast amount of information, statistical, in respect of expenditure and so on is offered with regard to them. Considerable activity, it is noted, was shown in relation to water supply in rural areas particularly, loans for over £900,000 (five million dollars or so) having been sanctioned.

Unemployment grants are stated to have been especially helpful in stimulating rural schemes. Large expenditures

are shown to have been made in connection with housing and improvement schemes. The actual amount paid by way of government grants in housing subsidies during the year ended March 31, 1932, was over £12,000,000—60 million or so dollars.

The total expenditure on subsidized housing since 1919 is now approximately £630,000,000, representing a figure in dollars I dare not try to calculate or to write down in these days when our, always welcome, American visitors can get a British pound for round about  $3\frac{1}{2}$  dollars.

In regard to poor law, national health insurance and contributory pensions, again a number of striking and interesting figures are given. During the year the average number of persons in receipt of institutional and domiciliary relief amounted to 1,046,079, representing 262 per 10,000 of the population. This is considerably higher than in the previous year, though it is pointed out that the process of appropriating poor law institutions for public health and other purposes has continued to contribute to the reduction in the number of persons receiving relief in poor law institutions.

An interesting test made during the first week of February of this year, to discover the number of persons (in England and Wales) insured under the Unemployment Insurance Acts who received concurrently out-relief and benefit under the Acts, showed the total numbers to be just under 25,000, the dependents numbering 76,329. The insurance payments made during the week totalled over £32,000 and the amount of out-relief £7,853.

In respect of pensions some of the figures given are rather striking: at March 31, 1932, in England and Wales alone the number of beneficiaries receiving widows' pensions amounted to 320,984 widows and 246,112 children, orphans' pensions numbering 13,222. The amount paid during the year was



over 14½ million pounds—70-odd million dollars.

#### MEDICAL BENEFIT UNDER THE INSURANCE ACTS

AS showing the extent and cost of medical service under the Insurance Acts, it is noted that the number of physicians in insurance practice was 14,840; the number of insured persons entitled to medical benefit approximately 15,000,000, and the cost of the benefit over £8,941,000, of which sum the doctors received over £6,467,000, and the insurance chemists for drugs, etc., £1,987,000. No analysis of the conditions encountered and dealt with by the insurance practitioners is given in this report, any references to disease and prevention, indeed, being limited to the part dealing with public health.

Here special consideration is given to tuberculosis and venereal diseases in connection with the descriptions of the progress of treatment and preventive schemes. In respect of venereal disease it is noted that whereas the number of attendances at treatment centers has increased, the number of new cases both of syphilis and gonorrhea is down. The decrease in the former is 4.40 per cent as compared with 1930. In the case of gonorrhea the decrease is approximately 7.47 per cent.

#### THE TUBERCULOSIS CONFERENCE

AS regards tuberculosis the Ministry of Health report notes a definite decrease in the number both of new cases and of deaths in the case of the non-pulmonary form; the actual figures are—deaths 6,160 and cases 18,378. The number of deaths from and cases of pulmonary tuberculosis shows in each instance an increase over that for 1930—54,596 cases as against 54,331, and 29,658 deaths as compared with 29,414. These increases mean probably very little, and certainly called forth no particular comment during the annual

conference of the National Association for the Prevention of Tuberculosis held in London toward the end of July.

Possibly for the reason that the majority of the papers submitted were of a clinical or scientific character, the press secured by the conference was not too good. The nearest approach to sensationalism was made by Dr. Bardswell, an officer of the London County Council and an authority on tuberculosis. Discussing the question of the protection from tuberculosis of the young adult, Dr. Bardswell pointed out that the increase in the death rate from the pulmonary form among young women at ages 15–20 and 20–25 was practically limited to the unmarried. In London he believed waitresses and machinists and others engaged in the poorly paid trades supplied more than their proportionate share of adolescent cases of the disease. In his view, the fact that the young married woman did not break down as did the unmarried worker of the same age was proof of the advantage gained by removal from the ranks of wage earners and the stress of competition.

Another speaker, discussing the recent relative increase of pulmonary tuberculosis in young adults, expressed the view that to a considerable extent it was due to a larger proportion of persons reaching the young adult age without previously having acquired tuberculous infection. Which serves to remind me of the plea of a certain distinguished physician in favor of leaving tuberculous milk alone because he felt that it would be wrong to deprive children of the repeated small doses of tubercle bacilli which served to prepare them for and protect them against the larger doses they were certain to encounter in later life. The fact that there was a real risk of acquiring abdominal or some other form of tuberculosis was, it appeared, not worth worrying about.

CHARLES PORTER, M.D.

*London*

PUBLIC HEALTH ADMINISTRATION  
HEALTH DIVIDENDS \*

DAVID LITTLEJOHN, M.D., F.A.P.H.A.  
*Director, Bureau of Rural Sanitation, State Department of Health,  
Charleston, W. Va.*

MONEY which is spent by an individual or a community may be classified either as an expense or an investment. Many individuals and communities have in the past, and unfortunately even at the present time, looked upon money, time, or effort spent in health protection as an expense. This is due to an entirely wrong conception of the object sought and the results attained through the efforts put forth. Money spent for this purpose culminated in many intangible results. In addition we get such results as lowered incidence of sickness and less time lost from work; increased average school attendance due to less sickness; reduction in number of cases and deaths due to communicable diseases; lessening in death rate among infants; and many other similar results.

EXAMPLES OF RETURNS FROM INVESTMENT—PRESTON AND KANAWHA

A concrete example will serve to illustrate the actual money saving resulting from the carrying on of a definite preventive program. In the County of Preston, W. Va., a study and comparison of the incidence of and cost of diphtheria alone, for the 3-year period prior to the organization of a whole-time health service, and for the 9-year period following its organization, gives very startling and definite information regarding the difference in cost to the citizens of the county during these two periods. There was a total saving to the citizens of the county during the past 9 years from the control and prevention of diphtheria alone of \$291,759.03. In other words, from a total investment of

TABLE I  
THREE-YEAR PERIOD PRIOR TO ORGANIZATION OF WHOLE-TIME HEALTH UNIT,  
COUNTY OF PRESTON, W. VA., 1920-1922, INCLUSIVE  
*Total cases of diphtheria reported 226 with 23 deaths*

Analysis of cost of cases and deaths:

226 cases, medical care, average \$50 each.....	\$ 11,300.00
(average 75.3 cases per year)	
23 deaths, average cost of each funeral \$200.....	4,600.00
(average of 7.66 deaths per year)	
23 deaths, average value of each life \$5,000.....	115,000.00
	<hr/>
Total cost for 3 years.....	\$130,900.00
Average cost per year.....	43,333.33

\$54,000 by the county itself during the 9-year period, a return of over 540 per cent was received.

\* *Quart. Bull.*, West Virginia State Dept. of Health, 19, 3 (July), 1932.

TABLE II

NINE-YEAR PERIOD SINCE ORGANIZATION OF WHOLE-TIME COUNTY HEALTH UNIT,  
COUNTY OF PRESTON, W. VA., 1923-1931, INCLUSIVE

*Total cases of diphtheria reported 211, with 7 deaths (average of 23.4 cases  
and 0.77 deaths per year)*

Analysis of cost of cases and deaths:

211 cases, medical care, average \$50 each.....	\$ 10,550.00
7 funerals, average cost of each funeral \$200.....	1,400.00
7 deaths, average value of each life \$5,000.....	35,000.00
<hr/>	
Total cost for 9 years.....	\$ 46,950.00
Average cost per year.....	5,216.00

General summary and comparison:

Average annual cost for period before organization of health unit.....	\$ 43,633.33
Average annual cost for period since organization of health unit.....	5,216.66
<hr/>	
Average annual saving during past 9 years.....	\$ 38,417.67
Average annual cost to county for health unit.....	6,000.00
<hr/>	
Net average annual saving to county.....	\$ 32,417.67

Another similar example comes from Kanawha County, in which a whole-time health service was commenced in 1926. Prior to this time approximately \$8,000 had been spent by the county annually to care for smallpox cases occurring in the county. Since the organization of the county health unit no money has been expended for this purpose other than the small amount involved in the purchase of smallpox vaccine.

These examples represent types of actual saving to the communities in which a definite preventive program is being carried on. Similar illustrations could be duplicated many times over in regard to other ways in which money is saved by this type preventive program.

A few years ago a small city and adjacent community in the northern sec-

tion of West Virginia had quite an epidemic of smallpox. When we visited this community to investigate the conditions and to get the situation under control, the owner of one of the largest stores in the city stated that during the 2 weeks in which the epidemic had already existed, the merchants of the city had lost over \$10,000 a week, due to customers who had gone elsewhere to trade because of fear of contagion from the disease. This latter example illustrates the cost to a community as a consequence of failure to provide for a program of prevention.

The evidence is indisputable that a well organized health service is a paying investment to any community, and should never be considered as simply an expensive luxury, but as an essential and necessary service.

**Organized Medicine and Public Health**—A symposium on the relation of the general practitioner to preventive medicine was held at the annual meeting of the American Medical Association in New Orleans and is reported in the *Journal of the American Medical As-*

*sociation* for June 11, 1932. The authors included G. Gill Richards, Roger I. Lee, Morris Fishbein, and J. N. Baker.

The family physician will always be a most important part in any plan of medical care, whether curative or pre-

ventive in character. Medical participation in health work can do much to extend the influence of preventive services and thus reduce needless sickness and mortality.

#### HEALTH DEPARTMENT REPORTS

Newton, Mass.—The 1931 per capita expense of the board of health amounted to \$.87. Only 1 case of diphtheria was reported in this city of 68,223 population during the year. There were 209 cases of scarlet fever reported, of which 41 per cent were hospitalized. The 123 cases not hospitalized occurred in 95 different homes in which there were 120 other children. There were 4 instances in which secondary cases occurred in the non-hospitalized group as contrasted with no secondary cases among the 164 children who lived in homes from which the cases were hospitalized.

Connecticut—The 1931 annual report of the State Department of Health indicates that the health of the state was particularly good during the year and that certain diseases, including measles, smallpox, diphtheria, and whooping cough, reached a low prevalence. For the third successive year, the typhoid death rate remained below 1.0 per 100,000 population.

Approximately 89 per cent of the population of the state are served by public water supplies, about 24 per cent of the population receive filtered water and 67 per cent receive water that has been protected by chlorination. Summer round-ups carried out in coöperation with the Connecticut Congress of Parents and Teachers resulted in 122 being held, and 2,290 children who were to enter school for the first time were examined as to their physical defects. The state with a population of 1,608,232 has 4,860 registered nurses, besides 1,173 registered outside the state. The public health instruction division re-

cords that over 180,000 persons were reached by exhibits, talks, and film showings besides those reached through 49 radio talks.

Oakland County, Mich.—According to the 1931 annual report of the county health department, 1,235 school children were referred to private physicians for the correction of physical defects discovered by school health examinations. It is also noteworthy that 53 per cent of the school population have been immunized against diphtheria, 9.4 per cent having been given the immunizing doses by their family physician.

The county laboratory made 46,472 examinations during the year at an average cost per examination of \$.17. The public health education service distributed 30,000 baby letters, 6,000 diphtheria immunization letters, and 4,000 each of May Day publications, health examination bulletins, *Child's Bill of Rights*, summer round-up leaflets, besides several thousand other bulletins. A creditable report describes in detail the health services rendered to the residents by this county department.

Quincy, Mass.—A progressive change in the health department organization occurred in 1931 by the establishment of a separate division of vital statistics and the employment of a full-time statistician. It is noteworthy that 97 per cent of the milk supply is pasteurized. There were 46 habit clinics held during the year, with 70 new cases and 93 old cases in attendance. Visits by children, chiefly referred by the school department and by individuals (9 by physicians) numbered 234, while 404 visits were made by the social worker. In the child guidance clinic conducted by the Medfield State Hospital, there were 55 new cases and 20 continued cases. This clinic, held in the Home Making School, was initiated at the request of the board

of public health and the public school authorities. Direct contact is maintained with the school authorities who visit the clinic. There are 10 cooperating agencies.

**Pike County, Ky.**—This annual report for 1931 is dedicated to "The Kentucky Blue Ribbon Children, the nucleus for a higher standard of mental and physical efficiency." There has been nothing found quite equal in value for the instruction of school children concerning the laws of health and hygiene, states the report, to the Blue Ribbon system adopted by the Bureau of Maternal and Child Health of the Kentucky Board of Health.

The requirements call for reasonable norms of growth in height and weight, normal or corrected vision, teeth and tonsils, good posture and health habits, ability to pass the school examinations, vaccination against smallpox, and immunization against diphtheria if under 10 years of age. "What is usually found after these requirements are complied with is a normal, healthy, growing child, with normal physical and mental efficiency. These children are usually more contented, more industrious, more active, have a pleasanter disposition, rarely tardy, and in my observation of the children, I have no knowledge of a case of delinquency."

All of the 215 graded schools of the county were visited during the year in conjunction with an intensive program of health education and study of physical conditions of the children. Records were also made of crippled children during the time of school visits. Of 186 cases recorded, 70 attended the Crippled Children's Clinic which was held under the direction of the Kentucky Crippled Children's Commission. Forty of these cases were recommended for hospital treatment, and most of them are receiving care. This report concludes with a 1-page statistical summary of

major activities and services, with a final page devoted to a map of the area showing the location of schools, roads and principal towns.

**San Luis Obispo County, Calif.**—

One of the most interesting annual reports of the year is the mimeographed record of this county of 39,262. A letter from the health officer to the county board of supervisors gives the purpose and method of preparation of the report, which follows in outline and content the A.P.H.A. *Appraisal Form for Rural Health Work*. A table of contents, an index, together with a map of the state, and a brief description of the county are aids to the reader. The report is a fairly comprehensive health survey of the county, prepared in an interesting and graphic manner. A careful accounting is made of the cost of health services for a period of years and of the sources of revenue.

During the past fiscal year, gross expenditures amounted to \$28,169, but fees from birth and death certificates, sanitary inspections, immunizations, and other sources, reduced the actual cost to \$25,843. Of the tax payers' dollar, a pie chart shows that \$.40 were for education, \$.21 for general government, \$.20 for trust funds and agency transactions, \$.13 for charities and correction, \$.05 for protection of person and property, and \$.01 for public health.

A crude death rate of 8.4 and an infant mortality rate of 57.5 are recorded. During the past 2 years, over 670 children have been given immunization treatment against diphtheria by the health department. The only case of this disease in 1931 was that of a child who arrived in the county a few days before he became ill. A detailed analysis is made of the poliomyelitis problem in 1930 when there were 67 cases. There was only 1 case last year. Eight cases of typhoid fever developed in 1931 with 1 death. The cases were traced to

transients who were in the county when they became sick and infected others before they could be isolated.

Each section of the report first presents standard objectives of service, followed by a frank analysis of accomplishments in the county. Three cities have contracted with the County Board of Supervisors to perform the health work of those cities. In order to carry out this work in an economical manner the county health office is located in the largest city, while one public health nurse resides and holds her office in the next largest city. Various officers of the department visit each of these cities once or twice a week and by telephone communication maintain direct contact in order that prompt service may be rendered when needed.

**Duke Endowment**—The sixth annual report of the hospital section of the Duke Endowment, for 1930, is an impressive record of valuable service in the development of hospital facilities in North and South Carolina. While 6 years ago the private hospitals had 55 per cent of the general beds in North Carolina and 45 per cent in South Carolina, they now have 42 per cent and 28 per cent, respectively, of these beds in the two states. Since 1924, the groups of non-profit hospitals operated by religious organizations and municipalities have increased 1 each in number, and the county group 2, but the group operated by board of trustees for the communities in which they are located has increased 30 in number (from 23 to 53) and 1,700 in bed capacity.

Contributions were made for the care of free patients in 1930 to 103 institutions in the two states. These included

80 general hospitals, 16 tuberculosis sanatoriums, and 7 special hospitals. At the end of the year these hospitals reported 6,300 beds for patients. Of beds available, 58.4 per cent were occupied on the average day, 54.3 per cent in the general hospitals, 79.4 per cent in the tuberculosis sanatoriums, and 71.8 per cent in the special hospitals. The beds for negroes numbered 25.8 per cent of the total. The report contains interesting photographs, building plans, statistical analyses and descriptive text, and is a valuable contribution to the subject of hospital service in small communities and rural areas.

**National Tuberculosis Association**—The 1931 report announces that the death rate from tuberculosis in the United States of 67 is now one-third of what it was when the organization was founded in 1904. "Tuberculosis still takes its greatest toll in the most important years of life, namely, from 15 to 45," and ranks first as the cause of death in this age group, with 1 out of every 5 deaths charged to it. A newly organized publicity department will handle publicity for the Seal Sale and for the Early Diagnosis Campaign, will assist other departments of the association, and will also try to give aid to the publicity work of state and local associations by means of field visits and correspondence. The valuable services rendered in the nursing and industrial fields are noted. "The preventive phase of industrial hygiene has shown marked strides within the past few years and opportunity is given for much health education work through the channels now opened by this newer phase of industrial hygiene."

# LABORATORY A PROJECTION METHOD FOR DEMONSTRATING PARTICLES SUSPENDED IN FLUID

J. A. KASPER, M.D., AND S. L. SIMMONS  
Department of Pathology, Herman Kiefer Hospital  
Department of Health, Detroit, Mich.

It is generally conceded that when any phenomenon is to be demonstrated to an audience, the most practical manner in which to accomplish this is to make that phenomenon apparent to all of the observers at the same time. When particles in suspension are to be demonstrated, there is a difficulty in showing them to large groups at the same time and from the same point of view. Moreover, it is time consuming since it is necessary to give individual demonstrations or, at best, to only small groups. To obviate some of the difficulties, the use of the parallel rays passing through a column of fluid in which particles are suspended to cast a shadow on a screen.

Round tubes are not satisfactory for this purpose on account of the refraction and diffusion of the light. It is necessary to have rectangular chambers so that the rays passing through the fluid are parallel. The rectangular chamber is constructed by placing a thin brass strip,  $\frac{1}{16}$ " thick and  $\frac{1}{8}$ " wide, bent in the shape of the letter "U," between two microscope slides. By means of two screw clamps (used to clamp rubber tubing) applied at the ends of the slides

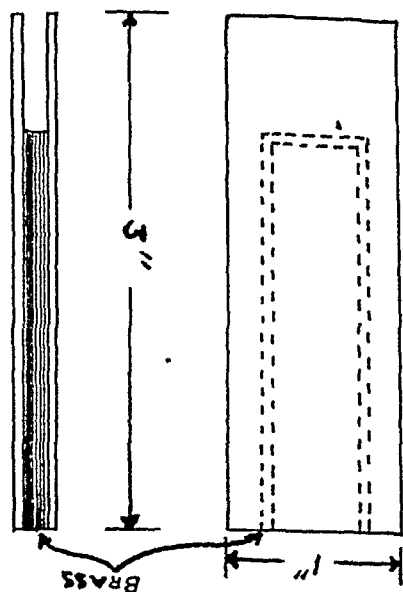


FIGURE I

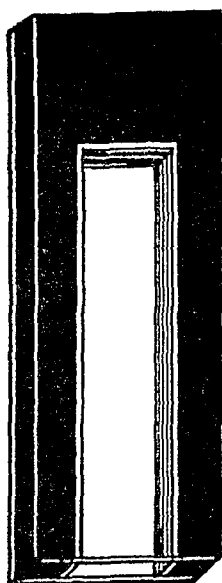


FIGURE II

in such a manner as to exert sufficient pressure, the brass strip is held in place. The ends of the strip are bent so that the space between them is  $\frac{1}{2}$ " in width,  $\frac{1}{8}$ " in depth and  $2\frac{1}{4}$ " in height, having a capacity of 0.14 cu. in. or 2.3 c.c. This allows for a border  $\frac{1}{4}$ " wide to the edges of the slides to be filled in with a solid substance such as sealing wax (Figure I). Sealing wax has been found most satisfactory because of its great cohesiveness and its rapidity of solidification. The chamber is shown in Figure II.

A panel is constructed to fit the projection lantern. This panel is placed anterior to the lenses through which the parallel rays from the source of light are transmitted. In the middle of the panel

is a slit  $\frac{1}{2}$ " wide and of the height of the column of fluid through which the rays are to pass. It is so situated that after the rays pass through the fluid in the chamber, they will continue through the center of the magnifying lens at the anterior end of the lantern. To accommodate the chamber and hold it in place in front of the slit in the panel, a slot is constructed into which the chamber can be inserted easily.

This arrangement has proved quite satisfactory for the demonstration of agglutinated bacteria as well as the particles in the Kahn precipitation test. When thrown on the screen, the images are enlarged sufficiently to enable one to determine differences between the sizes of particles in suspension.

**The Purification and Concentration of Diphtheria Toxoid**—This paper reports the results obtained in purifying diphtheria toxoid by precipitation with acetone, at low temperatures. The precipitated toxoid was obtained as a dry powder, readily soluble in aqueous solutions. The powder itself appears to be stable. When dissolved in half the original volume of physiological salt solution, the toxoid remained stable in the cold room for a period of 7 months. Only those toxoids should be used which have been completely detoxified by the treatment with formalin. The formalin is immediately and completely removed by precipitation with acetone.

Filtration through a Mandler filter, or the addition of preservative to the toxoid, did not impair its activities. The flocculating value of the purified toxoid, containing phenol, was lowered considerably by freezing at  $-10^{\circ}$  C.,

while when merthiolate was used as a preservative, it remained unchanged. In refined toxoids diluted to half of the original volume, approximately 62 per cent of the nitrogen was eliminated with about a 15 per cent loss in flocculating value. By this method, the antigenic activity of a toxoid below standard may be increased to a satisfactory standard.

The antigenic activity of the refined product in the immunization of guinea pigs may in general parallel its flocculating value but the relation between the results of these tests may not be proportional nor constant. As an immunizing agent in the guinea pig, the refined product possesses an antigenic activity that is equal to, or greater than, that of the unconcentrated toxoid.—Augustus Wadsworth, James Quigley, and Gretchen R. Sickles. *The Purification and Concentration of Diphtheria Toxoid*, *J. Exper. Med.*, 55:815 (May), 1932.



# VITAL STATISTICS

**Cerebrospinal Meningitis in 1930-1931**—The incidence of cerebrospinal meningitis has undergone some interesting changes in the course of the last few years. After the epidemic outbreak of the war years in Europe and the United States, during which the conditions of infection and of individual resistance were particularly favorable to the disease, the incidence decreased decidedly in most countries of Western Europe, until about 1922 and 1923, when it reached its lowest level. Germany was an exception; here it reached its maximum of 1,622 cases in 1922. Since then a progressive upward movement led to high points in 1929 in Austria, Belgium, Czechoslovakia, Italy, Latvia, Lithuania, Poland, and Yugoslavia. In 1930, no country reached its maximum, while 1931 was the year of highest incidence in England, Scotland and the Netherlands.

During the last 3 or 4 years, England, Egypt, Anglo-Egyptian Sudan, Northern Rhodesia, Macao, Hong-Kong, White Russia, Ukraine, have shown an annual average increase in the neighborhood of 40 per cent; the United States, Scotland, Mexico, and R. S. F. S. R. have shown moderate annual increases ranging from about 20 to 30 per cent; and Canada, Denmark, Germany, France, Switzerland, Austria, and Italy have shown increases which appear to have no definite trend and do not exceed an average of 10 per cent. Sweden, Netherlands, Poland, Hungary, Czechoslovakia, Portugal, Union of South Africa, Algeria, Japan, Shanghai, and Australia have shown decreases.

In England, the incidence of meningitis decreased after the epidemics of 1915 and 1917, with only 30 cases reported in 1923. Since then it has in-

creased, reaching 666 cases in 1930, 2,160 in 1931 and 686 in the first quarter of 1932. The cases of the first quarter of 1932 almost equal those for the first quarter of 1912, when the highest quarterly incidence (742) on record was reported. Apart from the epidemics noted in the army (Aldershot U. D.) meningitis morbidity has been the highest in the West Riding of Yorkshire. In London, where 131 deaths were ascribed to meningococcus meningitis in 1931, the disease attacked children particularly.

In the United States, meningitis prevalence has followed approximately the same course as in England, *i.e.*, decrease after the World War until 1924 and a progressive increase since then. The new maximum, however, was reached in 1929 in the United States. The morbidity had then risen to 9 per 100,000 as against 6.4 and 7.7 for the years 1917 and 1918, respectively.

In the Union of Soviet Socialist Republics the number of reported meningitis cases has been increasing since 1923, a part of the increase being due to the improvement in reporting. Even in towns like Leningrad, only a part of the cases are notified, as shown by the fact that the number of deaths still exceeds the number of cases reported by more than 50 per cent. In this city, from 1926 to 1929, 361 deaths from meningitis as compared with 232 cases were reported.

In Egypt, after brief appearances at the end of 1908 and 1913, the disease took root in 1917 appearing each year in the form of sporadic cases of small local outbreaks. The number of cases remained fairly low until 1929, but since then it has increased rapidly, from 17 cases in 1929 to 99 in 1930 and 871 in

1931. Since the beginning of 1930, isolated cases have been notified in the provinces of Lower Egypt. After the usual summer decrease the number of cases grew rapidly from the end of November, reaching as many as 637 cases per week in the middle of March, 1932. Of the cases identified from November to March, 30 per cent occurred in Cairo alone. Sporadic cases have, in addition, been recognized in all the provinces of Upper Egypt, particularly in Minya, since the end of February.

During recent years, the Anglo-Egyptian Sudan has suffered from cerebrospinal meningitis. Epidemics in February and March, 1932, brought the number of cases, which had fallen to 4 during the last quarter of 1931, up to 418 during the first quarter of 1932. In 1930, the disease prevailed especially in the Province of Mongalla (362 cases), which had for 4 years been by far the most important focus of the disease. It also attacked the Upper Nile Province (147 cases) and the Gedaref district (233 cases).

The 1932 epidemic is spreading in Mongalla Province, Upper Nile Province and the district of Niaro Kau and Funger, in Kordofan. In Funger nearly 200 cases were notified during the week ended March 19.

Sporadic cases occurred from time to time in most of the large ports in the Far East, but their prevalence varied considerably from one port to the other. At Shanghai, the first outbreak in 1920 and 1921 (with 76 and 29 deaths for the 2 years respectively, among the resident population of the International Settlement), was followed by a period of low prevalence. Then in April, 1929, an epidemic broke out which, among the residents alone, caused 403 deaths. At Hong-Kong, the incidence of meningitis was much lower; only 24 cases were recorded there in 1931, 4 of which were imported. The number of cases began to increase at the end of March, 1932,

reaching 31 with 12 deaths during the week ended April 16. Macao, the other port at the mouth of the Canton River, where 3 cases had been recorded in 1930 and none in 1931, has passed through a still more violent epidemic which occurred about a month before that at Hong-Kong. It caused no less than 362 deaths during the months of February, March, and April, a really high figure if it is taken into account that the population of the town of Macao is only about 70,000, and that of the whole territory 160,000.—*Epidemiological Report of the Health Section of the League of Nations* (Mar.-Apr.), 1932, pp. 83-89.

**The Cancer Record for 1931**—The death rate from cancer in American cities was just a shade lower in 1931 than it was in 1930. The death rate from this disease in this and other countries has possibly reached its maximum. The increasing practice of seeking earlier treatment and improvements in surgery and radiology are probably sufficient to arrest a further and substantial increase in the crude death rate. But the situation as it is, cannot be looked upon as otherwise than appalling.

Returns for 50 American cities since 1906 show a rise in the cancer death rate from 71.6 per 100,000 in 1906, to 100.2 in 1920, and 122.3 in 1930. During the last year under review, there was a slight decline to 121.0 per 100,000. A somewhat similar decline took place between 1911 and 1912 when the rate fell from 82.8 per 100,000 in 1911 to 80.3 in 1912. Such declines for short periods are of little practical significance.

An aggregate of 177 American cities shows that during the 2 years 1930 and 1931, the death rate from cancer changed from 117.4 per 100,000 in 1930 to 116.9 in 1931. The rate increased in 82 of these cities and declined in 95, while the range in rate was from a maximum of 215.7 per 100,000 for Madison, Wis., to a minimum of 29.7 for Ham-

tramck, Mich. These rates, of course, are affected profoundly by the admission of non-residents to local hospitals for treatment and do not clearly visualize the exact situation without an extended detailed analysis, which, however, is not possible. Out of 25 cities with cancer death rates in excess of 150 per 100,000 in 1931, 7 cities recorded rates above 170, Madison, Wis. (215.7), Concord, N. H. (195.3), Portland, Me. (194.4), San Francisco, Calif. (190.2), Troy, N. Y. (179.8), Newburgh, N. Y. (172.1), and Oak Park, Ill. (171.9).

The 1931 cancer death rates for the 5 largest cities in the United States are 133.3 for Philadelphia, 192.2 for Los Angeles, 117.6 for New York City, 111.8 for Chicago, and 69.2 for Detroit. It is shown that the actual number of deaths from cancer in these 5 cities increased from 17,326 to 17,680. By way of contrast, attention may be called to the 5 cities, which in 1931 had rates of less than 50 per 100,000. These cities were Hamtramck, Mich. (29.7), Winston-Salem, N. C. (41.6), Cicero, Ill. (47.8), Highland Park, Mich. (49.3), and Flint, Mich. (49.9).

Some of the local changes in the cancer death rates from 1930 to 1931 have been startling. Thus, in Albany, N. Y., the death rate from cancer declined from 173 per 100,000 in 1930 to 147.9 in 1931. The rate for Brockton, Mass., declined from 142.8 to 115.0, and that for Cambridge, Mass., declined from 158.3 to 129.7. A very marked decline occurred also in Holyoke, Mass., from 173.6 to 105.2. The rate for Galveston, Tex., increased from 64.0 to 113.0 and that for Greensboro, N. C., from 62.5 to 128.4. An extraordinary increase occurred in Hartford, Conn., from 99.0 to 145.9. The actual number of deaths from cancer in this city increased from 163 to 244. Another pronounced increase occurred in Hoboken, N. J., where the rate increased from 75.6 to 122.6. In Trenton, N. J., the rate in-

creased from 119.9 to 157.4.—Frederick L. Hoffman, *The Cancer Records for 1931. Spectator*, 128: 10-13 (May 12), 1932.

**Decline of the Birth Rate in France**—A study that has recently been published on the vital statistics of France for 1931, points out that the birth rate fell off sharply toward the close of the year. A comparison of the birth rates for the corresponding quarters of 1930 and 1931 reveals the following differences: first quarter, increase 937; second quarter, decrease 3,537; third quarter, decrease 4,907; fourth quarter, decrease 11,155; for the entire year, decrease 18,662.

The number of marriages furthermore, having diminished by more than 16,000 it is to be feared that the reduction in the number of births may be still greater in 1932.

If one notes that, of the 730,000 births in 1931, 55,000 were of children of foreigners, whereas, of the 680,000 deaths, there were only 30,000 deaths of foreigners, it will be seen that the French excess of births over deaths in 1931 was only 25,000. This small excess runs the risk of being transformed, next year, into a permanent deficit unless something energetic is done to promote a better birth rate. Finally, since the number of emigrants in 1931 exceeded the number of immigrants by more than 25,000, the population of France has in reality diminished, the first time that that has happened since the war.—*J. A. M. A.*, 98: 2150-2151 (June 11), 1932.

**How Prevalent is Syphilis?**—In a recent issue of the *Weekly Bulletin* the number of cases of syphilis in New York City reported directly to the Department of Health was analyzed and the opinion was expressed that the reporting of this disease by physicians, hospitals and clinics was fairly satisfac-

tory. The data presented indicated that approximately 10 per cent of the adult population was infected. Some have thought this figure too high. Confirmation of its essential validity is contained in the Report of the New York State Health Commission which has just come to hand. According to a table in this report, showing the number of cases of syphilis reported in up-state New York 1919-1930, the total number of new cases reported during these 12 years was 145,039, the number rising from approximately 9,000 in 1919 to nearly 14,000 in 1930. In addition to this the results of 1-day censuses of cases under treatment by physicians, hospitals and clinics are shown. From these surveys it can be seen that the number of cases of syphilis under treatment at the time of the census in 1930 was 15,732. These figures, however, do not permit the calculation of an annual attack rate. In this connection the following excerpt from the Commission's report is most interesting:

The State Department of Health, as part of its survey prevalence in 1930, collected information concerning the number of new cases diagnosed for the first time during a 1-month period. If the month (April) for which this information was secured is typical, there is indicated for up-state New York a minimum annual attack rate for syphilis of 4.4 per 1,000 of population, or 25,339 new cases of syphilis annually.

The estimate as to the annual attack rate based on the number of cases presenting themselves for treatment during a particular month checks closely with similar estimates based on the known turnover of clinic patients. For up-state New York, therefore, it is estimated that at present approximately 25,000 cases of syphilis are occurring each year.

If these figures are approximately correct they would indicate that even more than 10 per cent of the adult population is infected with syphilis, for it is necessary to multiply the 25,000 new cases annually by the average number of years of life for these individuals. Assuming an average life span of 40

years for the individual, the total cases of infection would amount to 1,000,000 cases in up-state New York. This is an astounding figure. On the basis of a population of 6 million for up-state New York the figures cited indicate that an assumption of 10 per cent of the population as infected with syphilis would probably not be far from the actual facts, and that to say that 10 per cent of the adults were infected would be conservative.—New York City Dept. of Health, *Weekly Bull.*, 21: 147-148 (May 14), 1932.

**Public Demands Reduction of Road Accidents in Great Britain—**In spite of the new road traffic act, the appalling death toll of the roads continues without sensible diminution. In Great Britain in 1931 no fewer than 6,691 persons were killed and 202,119 injured in street accidents. Every day of the year 18 people were killed and 553 injured. The only favorable feature was that last year the number of fatal accidents was 614 less than in the previous year, but on the other hand the non-fatal accidents were increased by 24,224.

In addition to the figures given for the whole country, the following were given for London: in 1931, 1,325 persons were killed in the streets, as against 1,398 in 1930, a reduction of 5.2 per cent, as against a reduction of 8.5 per cent for the country as a whole. But closer examination revealed the startling fact that decrease of 73 in the London deaths was accounted for almost entirely by the fact that 67 fewer motor cyclists and pillion riders were killed, indicating that the motor cycle was being less used in the metropolitan area. As against the 8.5 per cent decrease in deaths throughout the country must be set the following: (1) There has been a reduction of about 3.2 per cent in the number of vehicles licensed to operate on the roads; (2) the number of per-

sons injured has increased by 13.5 per cent. The returns for London for the first 3 months of 1932 are most disquieting.

The number of persons killed has in-

creased from 289 in the corresponding quarter of last year to 314, and the injured have increased from 9,943 to 10,865.—*J. A. M. A.*, 98: 2,030 (June 4), 1932.

## PUBLIC HEALTH ENGINEERING

### THE TRAVEL OF POLLUTION UNDERGROUND\*

A. F. DAPPERT

*Assistant Engineer, Division of Sanitation, New York State Department of Health, Albany*

ALTHOUGH sewage works operators and superintendents of sewers are probably not accustomed to giving much consideration to the extent to which pollution from structures which are under their control will travel underground, there are occasions when it is desirable to have a speaking acquaintance with the subject. Furthermore, the fact that sewers and sewage treatment plants in general do contribute some pollution to the soil, together with the more significant fact that under certain conditions the consequence of such pollution may be serious, makes it desirable that some attention be given to this subject. It is felt that operators should possess a knowledge of the various points about the plant where soil pollution may occur and the various possibilities, probabilities, and improbabilities.

As an example, at some sewage treatment plants water for general washing and scrubbing purposes is obtained from ground water in the vicinity of the plant. In such a case the operator should have some idea of the safety of such a supply, and to know this, unless he is willing to depend entirely upon

outside advice, he must have some knowledge of whether or not pollution from any of the plant structures is possible. Many other examples could be cited which would indicate the need for the consideration of this subject by the plant operator.

Not infrequently, a neighboring resident will complain that a private well is receiving contamination from either the plant or seepage from the outlet water course, and in such cases it is advantageous to the operator to be so well informed that he can talk convincingly about the matter. In maintaining supervision of public water supplies we are accustomed to place the burden of detecting and eliminating sources of pollution upon the water works superintendent or operator. But usually the water works superintendent will not have the knowledge relative to the peculiarities of the sewerage system that is possessed by the superintendent of sewers. There is therefore an opportunity for the superintendent of sewers to contribute something to the protection of the public water supply. Although it is the responsibility of the water works superintendent or operator to know what possible sources of pollution may be contributed to the water supply, there is need also for the sewer-

\* Paper (revised) presented at the Spring Meeting of the New York State Sewer Works Association, at Buffalo, June 10-11, 1932.

age works operator or superintendent of sewers to know definitely that there is nothing about the sewerage system or treatment works which can be regarded as a source of pollution of the public water supply. It is believed that the sewage works operator should know at all times the definite points at which pollution may be contributed to the soil by the various units of the plant and know also the possible or probable effects of such soil pollution as may be contributed by the various units of the plant.

Among the several points at which pollution of the soil may occur we might enumerate the following:

1. Leaks in sewers which permit the contamination of the immediate surrounding soil with dangerous pollution. Ordinarily from the sewage works operators' standpoint a leak in a sewer is objectionable because of the possibility of admitting large quantities of ground water. However, there are situations occasionally in which the leakage from the sewer into the surrounding soil becomes the major consideration. We need to keep in mind that in municipalities maintaining both sewer and water systems, there is an intricate network of underground pipes which cross and recross each other. In some instances there is need for concern about the sewer which crosses the water main; for example, when due to peculiar hydraulic conditions a negative head may at times exist in the water mains, thus permitting contamination of the water main by leakage from the sewer.

Such a situation arose in one municipality in this state. Sewers and water mains were laid some 35 years ago and for purposes of economy were placed side by side in the same trench. Due to peculiar hydraulic conditions there developed at times a negative head in one section of a water main located in the higher portion of the village. It happened also that a typhoid carrier lived on the street in question, and his place of residence was connected with the sewer that was embedded in the trench along with the water main. Several cases of typhoid fever developed along the street and later investigation disclosed that some of these cases probably arose by reason of the contamination of the water main with sewage from the sewer which paralleled it. It is possible in this case that had the village been served by either a water works superintendent or superintendent of sewers who

fully appreciated the significance of all the various factors involved, improvements would have been made long ago which would have prevented the outbreak.

Another example of the serious conditions that are sometimes created by leaks in sewers is furnished by the experience of a certain city in the middle west some five or six years ago. The city water supply, obtained from a group of wells, was collected in a receiving reservoir across the street from the wells. Water was piped across the street through a tile line which crossed a sewer line 2 feet above it. The sewer became clogged at a point about 400 ft. below the pipe crossing, causing it to become surcharged at its intersection with the water line, and resulting in the serious contamination of the entire city water supply. About 3,000 cases of dysentery developed. The services of an efficient superintendent of water works or of sewers who fully appreciated the dangerousness of the situation might have precluded this trouble.

2. Leaks from plant structures such as wet wells, tanks, etc.—Although generally watertight construction is secured, it is nevertheless possible for leaks to develop. Whether such leaks are serious depends, of course, on local circumstances. Recently the Commissioner of Health felt obligated to refuse to approve the location of two proposed sewage treatment plants because they were too close to the wells serving as a source of water supply for the respective communities.

3. Drainage from sludge beds or intermittent sand filters that seeps into ground strata below the level of the underdrains—I know of one instance where a private well was apparently affected by such seepage.

There has always existed a difference of opinion in regard to the distance to which pollution will travel underground. About 1923, the U. S. Public Health Service undertook a series of elaborate experiments at Fort Caswell, N. C., and some other places to secure authoritative data on the subject. The results are published in *Hygienic Laboratory Bulletin No. 147*. In brief, the Fort Caswell experiments included the construction of shallow pits in sand in which excreta and cow manure and uranin dye were placed. Numerous sterilized wells were then sunk in different directions and at varying distances from the experimental trench,

and frequent samples collected from the various test wells to determine the extent to which underground pollution had progressed. It will probably be of interest to review briefly the condensed conclusions contained in this report.

1. Bacteria pollution as determined by the test for *B. coli* was demonstrated in 1,213 samples of water taken at distances varying from 1 to 232 ft. from the experimental trench.

2. Chemical pollution as determined by the test for uranin dye was demonstrated in the ground water at distances up to 450 ft. from the experimental trench.

3. Both the dye and the *B. coli* travelled only in one direction, namely in the direction of ground water flow.

4. Neither the dye nor *B. coli* was found in other portions of the experimental field.

5. Wet weather resulting in high ground water was found to be conducive to the extension of pollution.

6. Dry weather resulting in low ground water was found to be inhibitive to the extension of pollution, and conducive to the purification of the ground water.

7. The tendency was demonstrated for *B. coli* to localize in the upper blanket at or near the ground water table, and water samples in a given well from this blanket were found to show heavy *B. coli* pollution, while water samples a few inches lower were found to be generally *B. coli* negative.

8. It was found that when the ground water falls, the *B. coli* tend to filter out into the capillary fringe or, in case of a further fall, into the soil and that if the soil remains dry sufficiently long the *B. coli* die out.

9. It was found also that the uranin dye tended to float out in a blanket at or parallel and close to the ground water table, and to filter out upon the fall of the ground water into the capillary fringe and soil, but did not always seem to rise with higher ground water.

10. The investigation demonstrated also that the experimental infection of the ground water remained alive for more than 2 years and 8 months and that uranin dye was recoverable from the ground water for a similar period of time.

11. The investigation brought out also the fact that as pollution travelled it did not appear to expand laterally in a fan shape but on the contrary to contract into a narrow band.

The report brings out admirably the fact that the distance to which pollution can extend depends upon a number of

factors, including rate of ground water flow, the pH of the soil, geological formations, bacterial competition, available food supply, bacterial mortality, rise and fall of the ground water dependent upon the weather, etc.

Where sewage works are constructed on limestone formations or sewers are laid in creviced rock the opportunities for serious contamination of the ground water are much greater than when the structures are built upon sands or clays. There was one instance where a subdivision of a city was to be served by an Imhoff tank with the effluent discharging into a limestone sink hole, situated about 2 miles from the Mississippi River. Fluorescein dye placed in the sink hole appeared in the river about 48 hours after its introduction and about 100 ft. above the water works intake. Naturally the plant was never constructed.

In another case a small village obtained its water supply from deep wells penetrating limestone and located in the high section of the village. The sewage treatment plant was located on the opposite side of the village and in the low section. The effluent from the tank was discharged to a small water course strewn with rock and most of the effluent seeped away. Shortly after the sewage plant was placed in operation the wells developed contamination. An investigation disclosed that the rock strata were inclined at reverse angles to surface slopes and that the effluent from the sewage works was contaminating the wells.

I want to close with a brief recital of an experience recently encountered at Rockville Centre. That village is served by a sewage treatment plant of the activated sludge type and the effluent is discharged onto percolation beds whence it seeps into the ground waters tributary to a small creek. Residences are situated down stream along this creek, and in one particular case the water is used for watering vegetables,

lawns, etc. For some time the residents in the vicinity of the plant complained about the high condition of ground water and the fact that in some private wells the water showed the effects of contamination as reflected by high chloride values.

In April of this year some of the residents along Parsonage Creek below the plant brought an action in the New York Supreme Court, County of Nassau, against the village of Rockville Centre, the principal allegation in which was as follows:

The filter beds are constructed and maintained in such manner that waters therefrom seep into and enter the headwaters of the said Parsonage Creek, carrying with them harmful bacteria and other matters and substances which contaminate and pollute the waters of said Parsonage Creek, rendering them unfit for use and dangerous to the health of the plaintiff and other residents along the course of said Parsonage Creek.

The village officials confronted with a lawsuit of this nature naturally developed a keen interest in the subject of the distance to which pollution will travel underground. Normally the sewage effluent produced at Rockville Centre is discharged onto the surface of one or more of the percolation beds located within the plant grounds, and the effluent then percolates into the natural sand and gravel deposits upon which the beds are constructed, and enters the ground water tributary to Parsonage Creek. There was no reason to deny therefore that seepage from the percolation beds reached Parsonage Creek. It was known also that a sewage effluent produced by the activated sludge process under proper operating conditions is in general terms practically clear, stable, non-putrescible, low in oxygen demand and with a changed and reduced bacteria content so that it may be safely applied to percolation beds or discharged to surface waters without the creation of offensive conditions.

As I have indicated previously there

is considerable literature on the subject which tends to show that polluted waters in travelling a short distance through sand become purified by reason of the natural purification processes established in the soil. In the case of Rockville Centre, then, it could reasonably be expected that whatever bacteria were contained in the effluent as applied to the percolation beds would be completely removed in the first 200 or 300 ft. of travel of the seepage through the soil and that any organic matter contained in the effluent would eventually become completely oxidized. On general principles, considering the distance between the percolation beds and Parsonage Creek (more than 1,400 ft.), it was felt that serious contamination of creek waters could not result from the method of sewage disposal now employed by that village.

It was concluded that whether or not such contamination of creek waters did take place could be demonstrated only by definitely locating the underground path of seepage from the percolation beds between those beds and the creek, and the collection therefrom of samples of water for bacteriological examinations; and that if samples of water collected from the underground seepage from the percolation beds showed no bacterial contamination it was then safe to conclude that harmful bacterial contamination of creek waters does not result from seepage from the beds. This was the general procedure followed during the investigation.

Chlorides, being a harmless inert mineral constituent of sewage, undergoes no change during the process of sewage treatment. The chloride value of the effluent could be expected to be the same as in the original sewage although there is considerable fluctuation in the amount present at different times. In general, chloride would be high in sewage or sewage effluent and low in normal surface or superficial



TABLE I

	Well No.				
	1	2	3	4	5
Distance from percolation beds—feet.....	400	800	1,000	1,300	1,400
20° Bacteria per c.c. ....	liquefied	2	17	10	2
37° Bacteria per c.c. ....	0	1	2	0	0
Test for <i>B. coli</i> group .					
In 10 c.c.....	0+3—	0+3—	0+3—	0+3—	0+3—
In 1 c.c.....	0+3—	0+3—	0+3—	0+3—	0+3—
In 0.1 c.c.....	0+3—	0+3—	0+3—	0+3—	0+3—

ground water. This phenomenon would make it possible to locate with certainty the underground seepage from the percolation beds.

Forty-two borings were made at and in the vicinity of the sewage treatment plant site. Most of these were made with a hand auger to a maximum depth of about 10 ft. In some cases it was not possible to reach ground water with the equipment available, and in other cases ground water was reached a short distance below the surface. Following this method and running an elaborate series of tests for chlorides, the path of underground seepage from the percolation beds was definitely ascertained to be from 50 to 100 ft. wide, although the area of the percolation beds occupied about 6 acres. To obtain samples for chemical and bacteriological analysis, 5 driven wells were sunk into the ground water strata in the line of seepage from beds at varying distances below the beds.

A sample of sewage effluent taken from one of the percolation beds gave among other things the following results (in p.p.m.): Free ammonia 12.5, albuminoid ammonia 0.154, nitrites 0.020, nitrates 0.04, total organic nitrogen 7.14, oxygen consumed 10.0, chlorides 38.0 and *B. coli* present in all of the 0.001 c.c. volumes tested.

Samples collected from the 5 driven wells, tapping the underground path of seepage from the beds gave the results shown in Table I.

Well No. 5 located about 1,400 ft. from the percolation bed tapped the underground stream of seepage about

100 ft. above the point where a spring fed from the seepage issued into Parsonage Creek. The chemical results on this sample are given in Table II.

TABLE II

Determination	p p m
Free Ammonia.....	6.0
Albuminoid Ammonia.....	0.04
Nitrites . . . . .	0.04
Nitrates . . . . .	10.0
Total Organic Nitrogen.....	1.39
Oxygen Consumed.....	1.8
Chlorides . . . . .	38.0

In comparing the results of the chemical analysis of a sample of the sewage effluent with the results for the sample collected from the seepage after passage through 1,400 ft. of sand it will be noted that free ammonia dropped from 12.5 to 6.0 p.p.m.; nitrates increased from 0.04 to 10.0 p.p.m.; total organic nitrogen decreased from 7.14 to 1.39; oxygen consumed decreased from 10.0 to 1.8; and chlorides were practically the same.

The investigation brought out clearly that while seepage from the percolation beds did reach the creek at points about 1,400 and more ft. distant from the percolation beds, and the flow in the creek was composed largely of former seepage from the beds, such seepage as it entered the creek did not contain dangerous contamination as indicated by the results of the bacteriological examinations made upon samples collected from the underground path of seepage. This finding, of course, was in line with prior reasoning. The fact that no *B. coli* and very low bacterial counts were found in

the sample collected from the first well located about 400 ft. below the beds would indicate that all bacterial pollution is strained out in a comparatively short distance of travel through the sand.

The results that occasioned some surprise were the nitrate and free ammonia values of the effluent as applied to the beds and the free ammonia results in the seepage as it entered Parsonage Creek. It was to be expected that the seepage would contain high nitrates, but it was thought also that the effluent from the sewage works would be highly nitrified. As a matter of fact, the sewage effluent was found to be practically devoid of nitrates but high in free ammonia, and the high nitrates in the seepage were due entirely to the nitrification accomplished in the travel of the seepage through the soil.

The fact that high free ammonia prevailed in the seepage at a point 1,400 ft. from the beds brings up an interesting point. It demonstrates at least that chemical pollution can be carried for a long distance through fine sand even when the rate of ground water flow is fairly slow. In this particular case the nitrates were reduced greatly after the seepage issued into the creek and were largely consumed by prolific growths of algae that occurred in the upper reaches of the stream. The free ammonia, however, continued to persist down stream and there was a gradual increase in nitrate values with a corresponding decrease in free ammonia values. The nitrate value of the stream at the point where seepage entered it was 0.5 p.p.m.

and the free ammonia value was over 3 p.p.m., while samples collected from the creek about  $\frac{1}{2}$  mile down stream contained 2.1 p.p.m. nitrates and only 0.14 p.p.m. of free ammonia. The fact that free ammonia was carried in the seepage for a long distance through the soil is therefore regarded as having the effect of increasing the nitrate values in the lower reaches of the stream and consequently contributing to algae production there that would otherwise not have occurred. If no free ammonia had been carried in the seepage it is very probable that high nitrate values would not have prevailed in the creek waters except in the very uppermost reaches of the stream where conditions were exceptionally favorable for algae production and nitrate consumption.

And in this particular case there is some reason to want the nitrate values reduced, as the water enters a pond on the estate of one of the complaining property owners about  $\frac{1}{2}$  mile below the headwaters of the creek.

How far will pollution travel underground? From the Fort Caswell experiments the answer is that bacterial contamination may travel as far as 232 ft. through fine sand and that chemical pollution as indicated by the uranin dye tests may travel as far as 450 ft. From the experience at Rockville Centre the answer is that bacterial contamination will be removed in a relatively short distance of travel through fine sand but that chemical pollution as indicated by free ammonia tests does travel through fine sand for distances considerably in excess of 1,400 ft.

# INDUSTRIAL HYGIENE

## Annual Report of the Chief Inspector of Factories and Workshops for the Year 1931 (Great Britain)—

Topics of special interest to the industrial hygienist include: Explosions, manufacture and use of cellulose lacquers, gassing (especially the description of the deaths of five workmen from anoxemia in a caisson head), the dangerous trades—asbestos, celluloid, cinematograph films, chromium plating, grinding of metals, potteries and refractory materials, and the hygiene of lighting and ventilation. A section on welfare refers to fish-curing, tanning, sugar factories, and cement. A section is devoted to the Home Office Industrial Museum, exhibits, and a conference of directors of foreign industrial museums. Especial interest attaches to the report by Dr. John C. Bridge, Senior Medical Inspector of Factories.

On the whole, the health of women and young persons has been generally satisfactory. The rate of sickness for "nervous disability" shows a tendency to rise. Vastly more days are lost from vague ill-defined disability due to *ennui* than from all the recognized industrial diseases together. This is a pressing problem in industrial health at the present time. No doubt, in the monotonous, repetitive processes of the machine age, the uninterested worker is an industrial invalid.

There was a marked decrease in lead poisoning (168 cases as compared to 265 in the preceding year). Chronic nephritis and cerebral hemorrhage were noted, likewise the confusing of lead poisoning with certain types of acute appendicitis. In potteries, fatal cases were high as compared to non-fatal, but they have been of long standing, not acute. Shot-blasting for removing

(lead) enamel from bath tubs produced cases. In the painting of buildings, dry rubbing down would appear to be the cause of the poisoning (waterproof sandpaper is suggested as the preventive).

Mercurial poisoning occurred in 3 repairers of electric meters, 2 who were using mercury as a catalytic agent and 1 in making thermometers. Five cases of carbon bisulphide poisoning were reported, none serious—4 in the treatment of acetate of cellulose by carbon bisulphide and 1 in the manufacture of the latter.

There were 30 cases under anilin poisoning: Making intermediates (D.N.B., D.N.T., T.N.T.) 10, making or use of anilin 8, making anilin colors, etc., 6, anilin black dyeing 3, 5-chlor-orthotoluidine 1, removing ink stains from linen 1, arseno-benzol process 1. The most frequent cause was absorption through the skin, as following splashing.

One case of chronic benzol poisoning was reported in a man who had worked with the substance for 38 years, and 8 years as superintendent with only slight exposure. The onset of ill-health was sudden. Following extraction of teeth the subject went downhill rapidly and died within a few months. Had there been no exposure to benzol, the diagnosis would probably have been agranulocytic angina. The symptoms noted among a small group of leather dressers were probably due to benzol.

There were 7 cases (2 fatal) due to arseniuretted hydrogen. Six of these (2 fatal) arose in the damping down of dross containing arsenides.

The number of notified cases of anthrax was 21 with 4 deaths as compared with 43 cases and 6 deaths in the previous year. One of the fatal cases was internal anthrax. During the past

32 years there had been reported 315 cases with 69 deaths.

There were 65 cases of chrome ulceration, 41 of which occurred in plating, 8 in dyeing and finishing, 3 in tanning, 2 in the manufacture of bichromate, and 11 in other industries. In one man, ulceration involved the nose, larynx, and vocal cords. Another suffered a severe ulceration of the scrotum due to chromic acid splashed on his apron. The Official Cautionary Chrome Placard should be followed and precautions have not been exaggerated nor made too stringent.

Epitheliomatous ulceration was reported in 156 cases with 46 deaths, compared to 194 with 36 deaths the preceding year. Of those of 1931, 41 occurred in connection with pitch (2 fatal), 35 with tar (13 fatal), 2 with paraffin and 78 with oil (31 fatal). The tar and pitch group showed 29 (2 fatal) in connection with patent fuel works; 15 (1 fatal) with tar distilling; 14 (8 fatal) in gas works; and 18 (4 fatal) in other industries. The oil cases were chiefly in connection with cotton mule spinning, 60 cases (19 fatal). Quarterly periodical medical examinations have now been instituted by the Tar Distillers' Association. The total of recorded cases among cotton mule spinners is now 1,062, including 867 who were still employed when the disease was first recognized, 52 who had retired from 1 to 16 years, and 143 in ex-spinners who had passed into other employment.

Eight cases of carcinoma of the bladder were reported, 5 of whom were employed in the manufacture of synthetic dyes, all coming into contact with *a*- or *b*-naphthylamine (a list is given of other benzene derivatives to which some were exposed).

The 666 reported cases of dermatitis show a decrease (last year, 789). The use of alkaline antiseptic wash (Liq. Chlorinated Soda with boric acid, B.P.C.) has proved its value in connection with oil dermatitis. Ointments

have proved effective in that due to chromic acid, turpentine and its substitutes. Alkalies, especially soda and lime, are the chief causative agents of dermatitis, especially when used as cleansing agents. About  $\frac{1}{3}$  of the reported cases of dermatitis were recurrent.

The Registrar General received 785 certificates of deaths from fibrosis of the lungs. Of these, 319 were silicosis (compared to 241 last year): Pottery 57, sandstone 69 (quarrymen 23, stone masons 46), coal mining 47, grinding 36, gold mining (ex-South African miners) 26, tin mining 17, ore mining 9, other mining 10, refractories (silica brick, etc.) 19, sandblasting 17, steel dressing and cleaning of castings 4, slate quarrying 3, flint and sand crushing 3, granite 1, scouring powders 1. In addition, 9 deaths were attributed to asbestos (with or without tuberculosis). Full particulars are now available of 35 deaths from asbestosis, or asbestosis with tuberculosis. The duration of exposure with these shows half the length of years as in the case of silicosis. Steel shot is gradually replacing sand in abrasive cleaning. Special regulations have been prepared for the asbestos industry (*Form 939*, Feb., 1932, price 1d. net).

Acetone was not demonstrated to be the cause of headache, nose bleed, jaundice, or secondary anemia in various ones among 10 women who complained of the fumes. Two cases of nicotine poisoning occurred from the bursting of a pipe, the hazard being absorption through the skin.

Dr. Horner made an examination of 133 operatives employed from 1 month to 8 years, 26 of whom came in contact with cellulose solutions as brushers, dressers or dippers, and 107 as sprayers of cellulose paint or lacquers. Both males and females were represented. It seems evident that: (1) there is a definite relation between conditions of ventilation and signs or symptoms of ill

health; (2) there is no apparent injury to health where xylol has been the diluent; and (3) local irritation of mucous membranes with headache, depression and fatigue, not amounting to disability, are frequently recorded, especially when ventilation is inadequate. (The report contains much more information.)—Home Department, H. M. Stationery Office, London (Obtainable from British Library of Information, 270 Madison Ave., New York, Cmd. 4098, price 70¢), 1932, 155 pp. E. R. H.

**A Medical Program for 10,000 Employees and Their Families**—Medical service in industry is evaluated in terms of major economics—the ability to recognize value of so-called intangibles, and to convert them into material values—and minor economics which are more readily reduced to a monetary value.

It is possible to have in smaller plants a well designed and effective medical program based on fundamental accepted practice. To operate a medical department successfully in any company requires (1) money, (2) medical personnel, particularly qualified in industrial medicine, (3) a definite objective and program, and (4) the wholehearted support of the executives of the company.

Probably the oldest form of health insurance exists in the mining industry. In many localities it is possible for a married man and his family to obtain complete medical care and hospitalization for the sum of \$40 per year.

In the Consolidation Coal Company the employee contributes directly while the company pays its share of the cost by defraying the expense of the Health and Preventive Medicine Program carried on in the various coal mining communities. There are approximately 10,000 employees who, with their families, compose a population group of from 30,000 to 35,000 persons, scattered over a wide area.

The objective of the program is:

... the treatment and care of sick and injured employees and their families, the application of hygiene, sanitation and education with the objective in view of preventing illness and keeping the employees of our communities in good health.

The personnel of the medical department consists of 22 full-time physicians, 12 public health nurses, several dentists, and a 50-bed accredited hospital. Special arrangements to care for the employee and his family are also made with private hospitals, institutions and consultants. To cover the wide area the organization is divided into medical units, each of which is practically self-sufficient.

Last year 163,024 persons (employees and members of their families) received medical attention. Of these 42,678 were visited in their homes. Some 80–85 per cent of these cases were minor illnesses, for the most part preventable. Experience from these is used for establishing preventive measures.

Every applicant for employment is given a thorough physical inspection, and if accepted, his entire family enters the health régime of the company which includes visits of the public health nurse and doctor, instruction in hygiene and sanitation, promotion of immunization, etc.

Typhoid, smallpox, and diphtheria were quite common several years ago but are now exceedingly rare. Close to 100,000 individual doses of typhoid vaccine and approximately 32,000 smallpox vaccinations were given in the past 3 years.

Strict attention is given to water supply and milk control. A local inspection committee consists of a public health nurse, a physician, and 2 or 3 local health officials who make periodic examinations including all houses, public buildings, stores, restaurants, schools, etc. Considerable improvement has followed this régime. Approximately 350

food handlers have been examined, 10 per cent of whom were found to be carriers of infectious and contagious diseases.

Organized school health supervision is promoted as well as clinics for infants, young children, expectant mothers and for suspected cases of tuberculosis. Other activities concern the development of community groups such as scout, civic, farm women, and church clubs; also fire prevention and dispensing of material relief. Monthly staff meetings are held in the various centers. The plan was inaugurated about 5 years ago.

. . . the amount and character of illness and death varies in direct proportion to the effectiveness of our preventive program. In other words, death, sickness and ill-health decrease as progress is made in prevention.—

D. J. Kindel, Medical Director, The Consolidation Coal Co., Fairmount, W. Va., *Executives Service Bull.*, 10, 7: 7-8 (July), 1932. E. R. H.

**Death of a Leader in Industrial Hygiene:** Sir Thomas M. Legge—Readers of this section should review the obituary by Charles Porter, M.D., in the July issue, 1932, of this JOURNAL (p. 735). Reference is also made to the more extensive memorials in the *Journal of Industrial Hygiene*, June, 1932 (pp. 235-236), and *The Lancet* (London), for May 14, 1932 (pp. 1069-1070), the latter of which carries a portrait of the deceased. A number of the members of our Association will also remember Dr. Legge's visit to some of the eastern states of this country several years ago.

His principal works were *Lead Poisoning and Lead Absorption*, with Sir Kenneth Goadby, his translation into English of Ramboisek's *Industrial Poisons*, his *Shaw lectures*, and *Milroy lectures*. He held the post of Chief Medical Inspector of Factories and Workshops (England and Wales) for nearly 30 years, and died May 7, in the

70th year of his life. The annual reports of his office have been rich sources of information for many years. His loss to industrial hygienists will be as greatly felt in America as in his home country.

He is survived by his widow, two sons and a daughter. E. R. H.

**Mortality Experience of International Typographical Union, 1931—**This mortality experience is presented by Dr. Hoffman in the form of death rates per 100,000. The year 1931 showed a slight advance in the general death rate over the year 1930, and there appeared to be an increase in death rate due to pulmonary tuberculosis, cancer, diabetes, pernicious anemia, pneumonia and hernia. On the other hand there was a decrease in nephritis, cirrhosis of the liver, gastric ulcer and appendicitis. There was a decrease in the death rate due to cerebral hemorrhage, general paralysis, paralysis of the insane and angina pectoris. Other cardiac diseases, embolism and thrombosis showed an increase in the death rate.

The reader is referred to the original article for the statistical tables which cannot be quoted here.—Frederick L. Hoffman, *Month. Labor Rev.*, 34, 6: 1310-1312 (June), 1932. L. G.

**Results of Supplementing the Dietary of Substandard Workers with Cod Liver Oil and Milk—**Sixty-three underweight young women engaged at tasks classified as light muscular activity were provided with a supplement of cod liver oil and milk to their usual home diet. Weekly records of body weight and efficiency rating were made.

Of 45 young women included in a full year's test, the average increase in body weight was 2.6 lb. There was a decrease in absences and an increase in efficiency rating. In a 2-year test all but 3 of 18 young women gained in weight each year, the average gain being

4.5 lb. during the first and 1 lb. during the second year. The average number of absences in a period from December to May showed a reduction of 61 per cent in the 2-year tests. The efficiency increased from an initial of 77.8 per cent to 80.1 per cent for the second year.—W. A. Sawyer and Laura Comstock—*J. Indus. Hyg.*, 14, 6: 207–215 (June), 1932. L. G.

**Decomposition of Dichlorodifluoromethane by Flames**—Dichlorodifluoromethane ( $\text{CCl}_2\text{F}_2$ ), often referred to as F-12 or Kinetic-12 has recently come into use as a refrigerant gas in household refrigerators.

The properties of this gas were studied by the Underwriters' Laboratories and the laboratories of the United States Bureau of Mines, and it was found to be a stable, non-irritating and non-toxic gas by these investigators.

It has, however, been suggested that this gas, when acted upon by flames, may be decomposed with the formation of hydrofluoric acid.

The authors of the present paper by means of a series of computations which are in fair agreement with actual tests conducted by them demonstrated to their satisfaction that no danger can occur due to the leakage of dichlorodifluoromethane subsequently coming in contact with gas flames. The authors conclude that dichlorodifluoromethane does not create a health hazard under these conditions.—Thomas Midgley, Jr., and Albert L. Henne—*J. Indus. & Eng. Chem.*, 24, 6 (June), 1932. L. G.

**Carbon Monoxide Distribution in Relation to the Ventilation of a One-Floor Garage**—This study was designed to determine the concentration of carbon monoxide in a one-story garage in a city in Pennsylvania. The garage studied was 60' x 52' with a ceiling height of 11' 8", it originally possessed no mechanical ventilation, but

windows were provided on three sides of the room. For the purposes of study mechanical ventilation was provided in the form of 6 15" propeller fans located at points on the long sides of the building. Eight surveys were made of the carbon monoxide content of the air of this garage with varying numbers of cars idling. The pyrotannic acid method was used for carbon monoxide determinations.

It was found as a result of this study that upward ventilation yielded the lowest carbon monoxide concentrations in the air, downward ventilation yielded slightly higher results. Cross ventilation and gravity ventilation through the fans and windows occupied an intermediate position, and finally no ventilation and gravity ventilation through fans alone, yielded the highest concentrations of this toxic gas.—F. C. Houghten and Paul McDermott—*Heating, Piping & Air Conditioning*, 4, 7: 495–501 (July), 1932. L. G.

**Medical and Hospital Problems of Workmen's Compensation in New York**—The Governor of the State of New York appointed a Committee charged with the duty of reviewing medical and hospital problems in connection with workmen's compensation insurance. On February 29, 1932, the report of the committee was transmitted to the Legislature by the Governor. The findings of the committee are of great interest and are presented here-with in some detail, since they may be found to be applicable to the functioning of the compensation laws in many other states of the Union.

In connection with hospital problems the committee found that the sums paid to charitable hospitals are in general less than the actual cost to the institutions, and it consequently recommended an amendment to the law providing that charitable or municipal hospitals be entitled to charge the reasonable cost of the services rendered without regard to ward-charity rates established by them.

The committee also recommended a change in the law on authorization of treatment, so that lack of authorization by employers or carriers in cases treated by municipal or charitable hospitals shall not prevent collection of payment for services; the enactment of a lien law in third-party suits similar to that in force in New Jersey; and provisions to insure payment for hospital services in other cases.

In regard to medical problems, the committee recommended the passage of the bill presented to the legislature by the department of labor, extending the scope of the compensation act to cover all occupational diseases. It is contended that the specific schedule, like that existing in New York, does not solve the problem, and as the average cost of covering all diseases in 10 other states is only about 1 per cent of the total compensation cost, the additional cost of the all-inclusive coverage should be only a small fraction of 1 per cent in New York, where 27 occupational diseases are already covered.

The committee suggested that insurance-company doctors be excluded from the room when the claimant is being examined by a state physician, to avoid any suspicion of bias or influence. It also recommended that "lifting" of cases (*i.e.* transfer of patient to other medical or hospital services by means of threat, suggestion or consideration from an insurance carrier) be prohibited under penalty.

The committee found unsatisfactory the practice of having the medical records supplied by agents of insurance companies, and recommended that these records be supplied by a disinterested party. It also suggested a fundamental change in the law, establishing a series of clinics under the supervision and direction of the state.

While present methods are not wholly satisfactory, the committee did not favor the free choice of physicians by patients, but suggested that some method be devised for rating physicians desirous of doing compensation work. It recommended that the subject be referred to the state board of regents.

Increases were recommended in both the professional personnel and the clerical staff of the department, as well as higher salaries for certain members of the latter.

Total disability, in the opinion of the committee, should be interpreted to mean that a man is unable to return to the occupation in which he was engaged when he was injured and should be compensated until he can resume that work. If he earns something at light work in the meantime, that amount should be deducted from the compensation due.

The committee was of the opinion that certain baffling and highly specialized medical problems can best be solved by a group of unbiased experts, and suggested the creation of a supreme court of review on medical questions, drawn from a panel of 75 men and to be used by either party for decisions on a purely medical matter; questions would be submitted to three or five of this body, both sides being bound by the decision.

As to departmental procedure the committee recommend an amendment to the act, relating to appeals; the establishment of a bureau for medical examination of claimants; provision of suitable examination rooms in the different cities or communities, or the use of automotive equipment with adequate facilities; and some changes in the law whereby a man injured while working for an uninsured employer will not become a burden to society because of the failure of his employer to comply with the law.

Bills appended to the committee's report cover the presence of insurance company doctors at examinations, authorization for medical or hospital treatment, reasonable charges by hospitals, and definition of charitable and municipal hospitals.

A special memorandum, endorsed by the majority of the committee, but not by the committee of the whole, expresses disapproval of the practice of insurance companies maintaining and operating clinics.—

*Month. Labor Rev.*, 35, 1: 92-93  
(July), 1932. L. G.

**Health Promotion in the Bell Telephone System**—It is the object of the personnel policy of the Bell System to bring out and develop the best quality in each employee and to weld that into effective coöperation in the business. The system comprises 24 operating companies, among them the Western Electric Company, etc. Excluding the Western Electric Company, the Bell Telephone Laboratories and the Bell Telephone Company of Canada, the total number of employees as of December 31, 1930, was 328,956, of whom 203,805 were women and 125,151 were men.

Especial emphasis is placed on the working conditions for women. To carry out the work which they do re-



quires a high type of employee. While tuberculosis or ill defined nervous disorders arise, there is apparently no health hazard from the standpoint of either disease or accident that is characteristic of the telephone industry.

The day is divided into 3 periods of 8 hours each. As a rule at least 1 hour is given for luncheon and rest, and additional rest periods of 15 minutes are allowed mid-forenoon and mid-afternoon. Much attention has been given to adequate seating and proper posture, also to ventilation and temperature regulation and lighting as well as to rest rooms, locker rooms, etc. These conditions are reflected in the homes of the employees. Many of the central offices provide rubbers and umbrellas which may be borrowed in emergencies—a provision of definite value as a preventive measure.

Cafeterias are usually provided and food-handlers are examined periodically. Lessons are given in diet, nutrition and health which have no doubt increased the demand for milk and green vegetables and decreased the consumption of sweets. Many of the companies provide various forms of recreation such as hiking, swimming, and bowling.

Absence from work on account of sickness is divided into two parts: (1) incidental or short-term absence, and (2) absence of more than 7 days. The latter have been recorded and analyzed in a standardized manner since 1913. There is a benefit and medical department. The requirements for physical examinations vary, depending on local conditions and policies but such are emphasized and encouraged, particularly for executives and older employees. Usual medical attention is referred to private physicians.

All general health activities are under the operating department with the co-

operation of the medical department, which latter therefore assumes no direct responsibility.

The voluntary health course has been in operation for 6 years, with approximately 140,000 graduates. Some 3,600 have taken the nutrition course, and more than 75,000 have received a course in safety instruction (chiefly men).—Leverett D. Bristol, *Hygeia*, 10, 5: 438–441, illustrated (May), 1932.

E. R. H.

Annual Report of the Rockefeller Foundation, 1930—The following items of interest to industrial hygienists are found in this volume: Appropriations made during 1930 in connection with the program for industrial hazards and economic stabilization (pp. 220–227) totaled \$980,000, of which \$875,000 were made to Harvard University, Boston; \$50,000 to the President's Conference on Unemployment, Washington, D. C.; \$15,000 to the National Institute of Public Administration, New York City; \$20,000 to the National Institute of Industrial Psychology, London, England; and \$20,000 to the Austrian Institute for Trade Cycle Research, Vienna.

The program at Harvard has now been extended to cover a variety of forms of hazards in industry, including accident and disease. A university committee in which the School of Public Health, the Medical School, the Engineering School, and certain departments of Harvard College, as well as the Business School, are represented, has supervisory charge of the program. The appropriation made by the Foundation in 1930 provided necessary funds over a 7-year period. (See also pages 278 and 284.)—The Rockefeller Foundation, 61 Broadway, New York, N. Y.

E. R. H.

## FOOD AND NUTRITION

**The Vitamin D Content of the Fat of Sea Perch, Porpoise and Seal**—The visceral fat of the sea perch (*Sebastes marinus*) and the subcutaneous fat of the porpoise (*Delphinapterus leucas* L.) and the seal (*Erignathus barbatus* M.) were examined both chemically and biologically. The acid value was least in the seal fat (0.91) and highest in the porpoise fat (9.30). The prophylactic method was employed and the experiment lasted for 3 weeks and the degree of rachitogenic effect determined by roentgenograms. By this method 1 gm. of the sea perch fat contained 100 to 150 vitamin D units and that of the porpoise less than 50 units. The fat of the seal was found to contain practically no measurable amount of vitamin D. It was concluded that the content of vitamin D in the intestinal fat of the sea perch was equivalent to the fat of the cod.—S. N. Matzko and D. A. Vital, *Ztschr. f. Unter der Lebens*, 5: 495 (May), 1932.

**The Reducing Power of Vegetable Food Material and Its Relation to Vitamin C; V. The Antiscorbutic Effect of Various Extracts of Cucumber**—Extracts of fresh cucumber were prepared with cold water and with diluted sulphuric acid and these extracts were fed to guinea pigs in varying amounts. At the end of the 63-day experiment, all of the animals, with one exception, on the water extract and the sulphuric acid extract were normal, comparable to the controls receiving 1 c.c. citrus juice daily. In the controls receiving only the basic diet all developed scurvy. The amount of reducing substances present was determined by titration and found to parallel the antiscorbutic potency of the extracts.

The reducing substance in these extracts succumbs to oxidation by atmospheric oxygen more readily than the reducing substance in citrus juice. The investigation of reducing substance in fruit and vegetable material is described (3: 241) by these authors in the same journal.—*Ztschr. f. Unter der Lebens*, 3: 276 (Mar.), 1932.

**A Case of Food Poisoning Apparently Due to Staphylococcus**—Chicken gravy, prepared on Tuesday from left over bits of chicken originally served on the preceding Sunday, when eaten at the evening meal on Wednesday produced violent vomiting, purging and prostration. The chicken when served on Sunday caused no illness.

Laboratory examination of the gravy disclosed no bacteria of the Salmonella group. Large numbers of staphylococcus colonies resembling those of *S. aureus* were found on the plain agar plates.

Sterile filtrates of staphylococcus cultures were prepared and fed to human volunteers. Typical symptoms of gastroenteritis followed. There was close resemblance between the symptoms produced by swallowing small amounts of the filtrate and the symptoms in the persons poisoned by the gravy. In both cases the onset of symptoms occurred 3 hours after the ingestion of the toxic material.—Edwin O. Jordan and John R. Hall, *J. Prev. Med.*, 5: 387 (Sept.), 1931.

**Experimental Study of Possible Routes of Contamination of Cakes with Food-Poisoning Staphylococci**—The object of the present experiments was to determine how cake that had been found to be a carrier of staphylo-

cocci causing food poisoning might have become contaminated—whether the staphylococci might have been present in the ingredients or whether the contamination might have occurred after baking.

Staphylococci introduced experimentally through inoculated egg whites or yolks into various cake batters of either the sponge or butter variety were killed during the baking process. This was true in cakes of pH ranging from 5.0 to 8.2. Staphylococci similarly introduced into a cream filler for cakes were destroyed during the cooking of the filler. Staphylococci inoculated into the filler after its preparation invaded the cake substance. Human feeding experiments showed that both the organisms and the toxic substance were present in the filler and in the cake itself.

It seems likely that in some of the food poisoning outbreaks due to staphylococci in cake, the filler is contaminated after its preparation, the microorganisms from the filler later invading the cake substance.—G. M. Dack, Oram Woolpert, Isabel Noble and Evelyn G. Halliday, *J. Prev. Med.*, 5: 391 (Sept.), 1931.

**The Effect of Heat Storage and Chlorination on the Toxicity of Staphylococcus Filtrates**—Sterile filtrates of staphylococcus cultures known to be capable of producing symptoms of food poisoning were studied to ascertain what effect heating, storage and chlorination had on their toxicity. In several cases ingestion of sterile staphylococcus filtrates, boiled as long as 30 minutes, was followed by nausea, diarrhea and prostration. In other experiments with human volunteers no symptoms followed the ingestion of filtrates boiled for 30 minutes.

Although the toxic substance present in staphylococcus filtrates is not completely destroyed by exposure for 30 minutes to the temperature of boiling

water, some diminution in toxicity may be caused by heating even at temperatures below 100° C. Sterile filtrates stored in the icebox for 3 or 4 weeks did not lose their toxicity.

In one case symptoms of gastroenteritis were produced by a filtrate stored in the icebox for 67 days. While the toxic power of the filtrates does not disappear on storage it is no doubt somewhat weakened.

In testing the effect of chlorine 0.1 c.c. of 0.0915 per cent solution of chlorine was added to a filtrate 3 minutes before it was swallowed. Typical symptoms occurred in 5¼ hours but they were less severe than in the case of the control. When 5 c.c. of the same chlorine solution were added the ensuing symptoms were very slight.

The data show that contact for 3 minutes with a rather strong dose of chlorine did not destroy the toxic quality of the filtrate.—E. O. Jordan, G. M. Dack, and Oram Woolpert, *J. Prev. Med.*, 5: 383 (Sept.), 1931.

**A Preliminary Report on the Bacteriological Examination of Fresh Cream and Artificial (Reconstituted) Cream**—A bacteriological comparison of fresh cream and artificial (reconstituted) cream has been carried out with the following results:

1. The bacterial content of the fresh cream (plate count on standard agar and direct microscopical method) is practically 40 times that of the artificial cream.

2. The average keeping quality of the fresh cream during September to December was 38 hours, as compared with 56 hours for the reconstituted product.

3. The fresh cream reduced double strength methylene blue in two hours. The artificial cream generally took eight hours or over to reduce the dye.

4. The types of fermentation in the two products is very characteristic. All samples of the artificial cream gave a very stormy fermentation within 24 hours at 37° C. The natural product in all cases gave an even non-gassy curd.

5. Anaerobic spore formers of the *Clo-*

*stridium Welchii* group were detected in the artificial cream. These were traced to the milk powder used in manufacture.

—(*Welsh J. Agric.*, 6: 284–9, 1930. Summary taken from Imperial Agric. Res. Conference, 1927. Abstracts of *Papers on Agric. Res. in the United Kingdom*, 1929–30, p. 101.) Abstract, *Bull. Hyg.*, 6: 775 (Oct.), 1931.

**The Distribution of Vitamin B Complex and Its Components in the Peanut**—Two lines of experimentation were followed—one to determine the amount of vitamin B complex in peanuts and the other to determine the proportion of the components (B and G). Virginia Runner peanuts were used, both raw and blanched, the blanching consisting of heating in oil to about 300° F. insufficient to develop a brown color in the kernels.

The peanuts were separated into split halves, hearts, and skins, in the proportion of 95 per cent splits, 2.3 per cent hearts, and 2.7 per cent skins. Rats were fed a B complex free ration consisting of varying percentages of purified casein and starch, meat residue, vegetable fat and salt mixture, supplemented with cod liver oil.

In one series the peanut supplements were added to the basal ration so that all were approximately equal in energy value. On low levels of peanut supplements, the appetite of the rats was affected so that insufficient amounts of the vitamin were consumed.

Another series was run in which definite daily weighed quantities of peanuts were fed to the rats. On a 10 per cent level, none of the peanut products stimulated growth; good growth was made on 20 per cent of raw or blanched splits but not much increase with this level of blanched hearts. Moderate growth resulted with 20 per cent of blanched skins but no improvement when this was increased 50 per cent, possibly due to tannin or other astringent present.

Several months later, these experiments were repeated with the same peanuts but inferior growth showed storage had somewhat depleted the B complex. All of the blanched products contained less vitamin B complex than the corresponding raw products. In the determination of components B and G two rations were used—one devoid of both components and the other containing the antineuritic with very small amounts of vitamin G. The antineuritic vitamin from rice polish extracts did not induce growth in rats on the B complex free ration.

Greater gains were made when autoclaved yeast was substituted, showing peanuts relatively richer in the B than in the G factor.—F. W. Sherwood and J. O. Halverson, *J. Agri. Res.*, 44: 849 (June 1), 1932.

**Increasing the Vitamin D Content of Milk**—Since milk under ordinary conditions is a poor source of vitamin D, numerous trials have been undertaken to increase this vitamin in cow's milk, with conflicting results, except by feeding cod liver oil which tends to depress the fat percentage. In these experiments, irradiated ergosterol was administered, preliminary work having shown that 130,000 Steenbock rat units yielded a marked increase in the vitamin D of the milk from one Jersey cow.

Two Holstein cows in approximately the same stage of lactation and the same milk production were used under winter feeding conditions. The trial was divided into periods of 3 to 4 weeks' duration, and controls were fed 50 c.c. of corn oil, and the experimental animals the same amount of oil, containing in various proportions irradiated ergosterol from 7,500 to 200,000 Steenbock rat units.

The milk was made into butter which was fed to rats and the vitamin D measured by curative and prophylactic methods. The vitamin D content of

the butter fat increased from 0.17 Steenbock rat units per gm. to 2.5 per gm. when 200,000 rat units were administered. Similar results were obtained with chicks as the experimental animals.

Two rachitic babies were fed milk from the cows receiving the 200,000 rat units and showed steady improvement. Post-mortem of the cows used in the

test showed no abnormality from feeding of the ergosterol.

It is pointed out that while it is possible to increase the vitamin D content of milk many times, this method is too expensive to warrant its general application.—W. E. Kraus, R. M. Bethke and C. F. Monroe, Ohio Exper. Sta. *Bimonth. Bull.*, 136 (May-June), 1932.

## CHILD HYGIENE

### CHILD HEALTH TODAY\*

CHILD health today takes into consideration the welfare of the whole child in his varied relationships to home, school, church, and the community at large. Health is a delicate balance which the individual maintains between a number of conflicting forces, some of which reside in the child himself. Others arise from his immediate environment. This health balance is easier to secure in some children than in others. Individual children differ a great deal in their ability to keep healthy. No child is so well conditioned but that some untoward force may upset his health equilibrium. Not only does the child have to make constant adjustments and readjustments but his parents or guardians have to be ever on the alert to protect him.

Scientific knowledge must be applied to child health. Health habits should be inculcated, beginning early in infancy. In many situations the child is helpless to protect himself. For instance, the child has very little if any choice in the selection of his food or in the kind of milk or water he drinks. He has no con-

trol over exposure to communicable diseases in the community. He is at the mercy of motor traffic in the streets and public highways. Over these and many other hazards the enlightened community must exert control through a well organized department of public health. But a health department, no matter how well organized, cannot function effectively without intelligent co-operation on the part of the parents. In a very real sense the public obtains as much health protection as it is willing to pay for. Furthermore, it should abide by the public health regulations. We have at present enough scientific knowledge concerning child health which, if applied more extensively, would give to our children healthier and happier lives. It is especially important at this time that we do not relax efforts to keep our children in the best of condition.

We are on the threshold of a critical period in which more careful scrutiny will be given to programs and methods proposed in the name of child health. Future programs will not be launched upon sentimental propaganda of well meaning but misguided community organizers, but will be formulated on the basis of facts ascertained by trained investigators and carried out by technically trained persons. Practical appli-

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\* Radio talk over KMTR, Los Angeles, July 6, 1932, by Richard A. Bolt, M.D., Director of the Cleveland Child Health Association and Lecturer in Public Health and Hygiene at the Summer Session of the University of California, at Los Angeles, Calif.

cation of well established principles and methods to the individual child will be demanded of physicians, nurses, dentists, teachers, and social engineers.

There has been recently much loose talk to the effect that our child population has not suffered unduly from the depression. This is very unfortunate as it tends to divert us from the main issues involved in preserving health standards for the child which we have built up after many years of effort. The reduction of infant mortality together with the generally low death rates throughout the country have been pointed to with assurance that we need not worry about the health of our children. While it is true that our infants have been fairly well looked after and that our children in the schools have been kept from actual starvation by supplementary feeding, it by no means indicates that the children are in the best physical and mental condition. Children may be kept alive under such circumstances and at the same time be suffering from malnutrition and other grave disorders. There are indications from certain large centers that a considerable number of children, especially between 2 and 6 years of age, are not in a satisfactory condition at present. It must be borne in mind that the results of malnutrition and undernutrition do not manifest themselves immediately. Furthermore, a chronic state of malnutrition predisposes children to tuberculosis, the effects of which appear but slowly. This was noted distinctly in the war torn countries of Europe following the World War. The effects upon body growth and development may not be evident for many years.

There is another phase of this matter which should receive more earnest attention in these trying years. The uncertainty and insecurity in many of our homes today has a very bad effect upon both the physical and mental life of

children. Mental unrest and defiance of accepted social codes follow closely in the train of broken and upset homes. It is well known that there is a close relationship between physical and mental health. This is already showing itself in all of our large centers of population; in the increase of juvenile delinquency; in the revolt of youth, and in crimes against person and property.

School teachers report that children coming to school without breakfast, or inadequate breakfast, are listless and apathetic. A hungry child cannot be educated properly. Schools have found it imperative to finance extra feedings either from private contributions or out of the public treasury. Some states have passed emergency measures permitting school authorities to use school funds for supplementary feedings. This can be done readily as the school lunch room has become a useful adjunct to every progressive school system.

In the wave of economy now sweeping the country certain cities at first deemed it advisable to close the playgrounds during the summer months. More discerning thought would have determined to keep as many of them open as possible. Public playgrounds not only afford places of recreation for restless and harassed children but also make possible the feeding of those needing special nutritional care. They also afford opportunity to check up on the physical defects of a considerable number of children. This summer in some places physicians, dentists, nurses, and recreation directors are giving excellent coördinated service in the playgrounds kept open at public expense.

Good nutrition is a basic requirement of every child. Fortunately a well balanced dietary for the growing child is not complicated. It can be understood readily by any intelligent mother. The necessary elements which go to make up such a diet are relatively cheap at the

present time. They consist mainly of the following:

1. One quart of clean, wholesome milk for each child daily
2. A moderate amount of green leafy vegetables
3. Fresh fruit, preferably of the citrus variety
4. Some cereal foods. The whole grain products are desirable
5. Butter and fresh eggs

Very little meat will be necessary if the child is given adequate quantities of the foods just mentioned.

California is abundantly blessed with sunshine which is fortunately supplied free to all who will take advantage of it. Children should spend a considerable part of each day in the open air and sunshine and should be allowed ample fresh air during the night. There is absolutely no excuse in this part of the country to allow any child to develop rickets, scurvy, or any other of the deficiency nutritional diseases.

Accidents of one kind or another today cause the death or crippling of too many children. Accidents have assumed alarming proportions among children between 5 and 15 years of age. Accidental deaths of children under 15 years of age make up about one-fifth of the total deaths from accident. Deaths from burns, drowning, falls, and automobile accidents are most frequent. The total number of child deaths from automobile accidents has increased considerably in recent years, although the proportion of child deaths to adult deaths from automobile accidents has decreased almost one-half. While deaths from burns, falls, and drownings have decreased, the automobile death rate remains unduly high. This condition of affairs certainly calls for more vigilance in traffic regulations; more safety education and better provisions for the safety of children in our homes, at the playgrounds, and especially on the streets. Public playgrounds are an anti-

dote against accidents from playing in the streets. Here, as in the case of many other means of prevention, our knowledge far outruns our practice.

A development of major importance in which we are just beginning to get our feet on the ground is that of health education. The immediate future should see a thoroughgoing development of health education, not in name only, but in the basic elements of what actually contributes to health. Pioneer work has already been done along this line, but we must still evolve a sound pedagogical method of health education beginning in parental instruction and running throughout our whole educational system from kindergarten into college. If we can agree upon a few of the fundamentals of health and impress our teachers and prospective teachers with the value of getting these over to the child in the same spirit and with similar methods now employed in the best school practice, much will have been gained for child health.

We now possess two protective measures which should be applied to every child. Vaccination against smallpox and immunization against diphtheria have been thoroughly tested and proved relatively safe and effective against these two diseases. Where they have been applied thoroughly smallpox and diphtheria have gradually disappeared from the community. As young children are most susceptible to these diseases immunization should be carried out early in the child's life.

It is now well known that tuberculosis is usually acquired in childhood either from individuals in the home affected with tuberculosis or from infected milk. We have largely eliminated infected milk by tuberculin testing of cattle and by the efficient pasteurization of milk. As pasteurization of milk becomes more and more prevalent, crippling from tuberculosis of the bones and joints will

become less and less common. Every child should be examined periodically by a competent physician in order to detect the earliest signs of tuberculosis. In this way only can the most effective measures for its control be applied. One of the most serious aspects of tuberculosis today is its appearance in young women of high school and college age. The tuberculosis death rate has been reduced considerably at all age periods except among young women. The dieting fad to secure a slender figure and overactivity at school and in social events undoubtedly contribute to this condition.

The prevention of tuberculosis in childhood is relatively simple if a few principles are carried out as follows:

1. Keep the child away from contact with tuberculous individuals, especially in the early years of life
2. Protect the general milk supply by efficient pasteurization and heat all milk given to young children
3. Maintain a good nutritional status in the child by proper feeding
4. Prevent as far as possible overactivity and fatigue in young people
5. Have the child examined periodically by a competent doctor

We hear much discussion today about the increase of heart disease. The mounting death rate from this disease is giving considerable concern to health authorities. When vital statistics for heart disease are carefully analyzed it is seen that the upward trend in heart death rates during the past 20 years has taken place largely in those over 40 years of age. In every age group under 40 years the death rates from heart disease have decreased. This is particularly encouraging in age groups under 15 years. It is fair to conclude that the efforts put forth for child health have had something to do with this result. Earlier and more exact diagnoses of heart disease are now made. Some of the infectious diseases which are frequently complicated by heart disease

have been brought under better control. Focal infections of the teeth, sinuses, tonsils, and adenoids have received earlier attention. Heart disease in childhood follows closely in the wake of rheumatic fever. This disease also appears to be on the decline in a number of places. The outlook, therefore, for the control of heart disease in childhood is not so gloomy as the crude death rates from this disease would lead us to believe.

Enormous progress has been made in the diagnosis and treatment of diabetes in children. Before the discovery of insulin practically every child who developed diabetes died before reaching 12 years of age. Now, with the proper administration of insulin thousands of children with diabetes at all ages are living and enjoying the normal activities of childhood. Many of these children are exceptionally intelligent. Some of the earlier cases treated with insulin are now married and have had normal children. Summer camps for diabetic children have been established in Cleveland, Detroit, and a few other cities where every facility for diabetic routine is available. These camps should be developed as an integral part of our child conservation program.

Our present-day gains in child health have been along the following lines:

1. Reduction of infant mortality by means of better feeding methods, protection of milk supply, and more skilled medical and nursing care
2. The control of smallpox and diphtheria and certain other communicable diseases
3. Improvement in nutritional standards
4. Prevention and control of tuberculosis
5. Prevention of simple goiter
6. Reduction in certain of the accidents
7. Treatment of diabetes in children

Any retrenchment, therefore, in our public health program which jeopardizes these gains is a confession of our ignorance or callousness to the essential health needs of children.



# PUBLIC HEALTH NURSING\*

**Japan Has a Course for Public Health Nurses**—St. Luke's College of Nursing in Tokyo started a one-year post-graduate course in public health nursing on May 1. Nurses will be prepared for the general field of public health nursing including school and industrial nursing. Instruction in public health nursing, preventive medicine, nutrition, methods of teaching, and social case work, plus practice work in clinic and field, are included in the course.—*Pub. Health Nurs.*, XXIV, 7: 414 (July), 1932.

**Public Health Nursing in Baltimore**—Dr. Joseph W. Mountin, of the U. S. Public Health Service, recently completed a health and hospital survey of Baltimore at the request of the Health Commissioner. Among the 23 major recommendations which he presented as a result of the survey are the 2 following which deal specifically with public health nursing:

No. 18—That as soon as practicable all nursing services of the Health Department be combined into a single generalized service and that a special supervisory staff sufficient to insure proper balance of work by the field nurses be provided.

No. 19—That new appointments to the nursing staff be limited to nurses possessing special training or previous experience in public health work, or that in lieu of such training or experience newly appointed nurses be given an introductory period of training in a special training area.—

**Public Health Is Purchasable, Baltimore** *Health News*, IX, 7: 51 (July), 1932.

**Prenatal Nursing in the Rural Areas**—Health workers have known for some time that wherever there has been

an organized effort to provide adequate maternity care, maternal mortality has been reduced. The report from a Toronto hospital shows that, of 1,020 women who attended a prenatal clinic and were confined in the hospital, only 1 woman died, and she died of heart disease. The Maternity Center records show a maternal death rate of 2.2 as compared with a rate of 6.2 for mothers living in the same district but not receiving their special care.

A great obstetrician has said that prenatal care is not an end in itself but only a means to an end; that good prenatal care is nothing but the foundation of good natal attention; neither is complete in itself, and if either is inadequate both may result in failure. "Nor," he says, "are they complete without good postnatal care. Improper postnatal care may thwart the result of good prenatal care."

In the city or the rural areas every expectant mother needs the assistance of someone who has time to sit down with her unhurriedly and dispel her fears and consider some of the commonplace details of her life. She needs this no matter how adequate her medical supervision. Nursing supervision does not take the place of medical supervision but supplements it.

In rural communities there are greater distances, fewer health workers, and greater social problems; these all complicate the prenatal program. Rural mothers are often lonely and eager for someone to talk to, and an alert sympathetic nurse can do a great deal of constructive teaching if she has the ability to gain the confidence of the mother. One nurse finds that she gets farthest if she takes time to have tea with her patients.

In some districts of Canada prenatal

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

group teaching has been done. This has decreased the nurse's travel time, given her more contacts, enabled her to do more effective teaching because demonstrations were possible and exhibits available. In most rural areas, however, this program is not practicable because of distance and lack of transportation, and nurses have to rely on home visits. Some nurses during the long snowy winter months keep in close contact with their patients by mail.

The best publicity for the nurse's prenatal supervision is the service rendered. One nurse increased her number of prenatal cases from 20 to 35 in 3 years. She told her patients if they valued her services to tell their friends about it, which they did.

The success of a rural prenatal nursing service depends upon the coöperation of the public health nurse with the medical profession and her ability to demonstrate the value of such a service to the public.—M. McCuaig, *A Rural Prenatal Programme*, *Canad. Pub. Health J.*, XXIII, 6: 271-274 (June), 1932.

**A Stitch in Time**—A public health nurse in Baltimore brought a sick boy home from school. He had a severe pain in his side and the family's first impulse was to send out and get castor oil to give him. The nurse persisted in entreating them to call the family doctor and persuaded them not to give a purgative, but to apply an ice bag to the side instead. The physician came and within an hour a surgeon had removed the boy's gangrenous appendix. The family physician wrote a letter to the city health department praising the nurse's work.—Public Health Nurse On the Job, *Baltimore Health News*, IX, 7: 53 (July), 1932.

**Public Health Nursing in State Health Departments**—The development of public health nursing in state

health departments is potentially the keynote of a sound public health nursing program in each state. However, in most states the budget and personnel for public health nursing are entirely inadequate to carry on a sound program. The different states show wide variations in the administration and functions of public health nursing in their health departments. A recent study indicates that these services have sprung up haphazardly without any accepted conception on the part of anyone as to the extraordinary opportunities or responsibilities of such services, and with no generally accepted fundamental principles of organization, function, or program.

In every state, also, we find a wide variation in local public health nursing services in organization, personnel, and program. Nationally there are generally accepted principles and standards of public health nursing which cannot be carried out locally to any great degree without some relatively immediate stimulus and leadership.

It is a generally accepted principle that public health nursing functions best as an administrative unit under the direction of a well qualified public health nurse, whether this unit is a separate division or bureau or functions as some part of the general administration set-up.

Local public health nursing organizations have functioned best perhaps where a local group of representative citizens have been associated with them. There might be an advantage in having a public health nursing council consisting of representative citizens from state groups to help strengthen the state public health nursing program.

Here are some functions the state department of public health nursing could carry on:

1. Put into practice standards of local organization and administration, of qualifications of personnel; of content of

program; and of records and statistics.

2. Be of advisory assistance to local nurses and organizations, giving a real educational rather than a mandatory or administrative service.
3. Carry on a staff education program for the nurses in the smaller and more isolated services in particular. This is done in some states by means of group meetings and special institutes. In other states there are field training centers where nurses can go to get "refresher" courses.
4. In some states public health nurses give direct service to local organizations, and this may sometimes be necessary to start the services, but it seems sounder to have local responsibility and local money for public health nursing supplemented by the state.
5. Study general and specific health needs of the state and results obtained from present activities to bring about a better distribution of nursing services in local areas.

If I am right that the sound and effective

development of public health nursing will be furthered most through strong and adequate public health nursing services in state departments of health, it behooves all of us to act accordingly. What does this mean? To my mind, this implies a careful campaign of public education through various local and state groups—nursing, health, medical, and civic. It means backing, supplementing, and co-operating with the services that already exist. The responsibility rests on local public health nursing associations; on state nursing organizations such as S.O.P.H.N.'s and public health nursing sections of state nurses' associations; on the various women's clubs and other civic groups; and on the N.O.P.H.N. It may mean legislation. It is for each state to study what it does mean and to marshal its forces so that what seems to be the most strategic approach to our goals may not be left in its present somewhat chaotic and unrelated condition.—

Katharine Tucker, Relation of State Public Health Nursing Services to County and Local Services, *Pub. Health Nurs.*, XXIV, 7: 357-362 (July), 1932.

# EDUCATION AND PUBLICITY\*

**As Never Before**—This fall and winter, as never before, public health work must prove its case as an essential in community life.

Whether we do more or less in the interpretation of the health agency we cannot do it too well for the safety of the next budget.

Letters on the subject will be welcomed by this department.

**Third and Last Call**—What you have printed or distributed on the following subjects is desired for display at the Washington meeting of the A.P.H.A. in October.

*National and state associations and departments:* requested to send lists of publications, slides, pictures, etc., etc.; copies of plays and other special forms, whatever their subject matter.

*News stories, etc.:* clippings and releases both are welcome, but clippings are especially desirable.

*Any good specimen* of any form on any subject is desired.

*Health councils and chests* are requested to secure material from their member agencies.

*Often two copies* are better than one. All should be addressed to "Washington Display," Evart G. Routzahn, 130 East 22d St., New York.

Some of the topics on which material is especially desired: Cancer, diet and nutrition, diphtheria, heart diseases, measles, mental hygiene, mouth hygiene, rural sanitation, summer warnings and advice, winter warnings and advice.

Depression conditions, house organs or bulletins, popular health education, radio, school health and health education.

**Write Before You Pack**—If you have anything to show at Washington in October, please *write*—and write *now*.

Otherwise, please don't bring exhibits or displays which call for space at Education and Publicity Headquarters.

Last year at Montreal several enthusiastic health workers turned up with material *after all plans had been made and the space allotted*. They were taken care of, but they never knew what other plans were disrupted and disappointments were experienced. *So please write before you pack*.

**The Depression Calls**—To Washington!—The Washington meeting of the A.P.H.A. in October will mean all the more to those who face budget cuts and those who recognize increased need for more and better health education.

**Come Bearing Questions—And Ideas**—We get more and we give more at conventions when we come with specific questions we want answered. Questions to be answered by the speeches or in discussion, in lobby sessions, at exhibitor's booths, or the headquarters of national agencies.

There are cases on record of a staff conference discussing points on which their convention representatives were urged to gather information.

And at least one agency, the Wisconsin Anti-Tuberculosis Association, has discussed what ideas and experiences they could offer as contributions to the discussion in various sessions of a convention.

**Statisticians, Epidemiologists . . .**  
—The displays at Education and Publicity Headquarters at Washington will have something for each of them. Try it once!

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\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

**Go To Meetings — Be a "Joiner"**  
—To go to meetings of many kinds—to attend gatherings of all sorts—is a real help to the publicity worker. To meet people and to see people on their own grounds, to learn who they are, what they do, what they are interested in, what they talk about, is a real asset.

To be a member of organizations brings helpful contacts. Every membership held by any staff member of an agency has its value. The payment of a limited number of memberships is a good investment for the agency.

**"Time Out" Needed for Good Publicity**—Health officers and other executives do well to *encourage the taking of time for reading, thinking, studying and planning.*

The urge for production and the doing of many things long have handicapped some of the best workers in health education and publicity. And the pressure for haste and quantity has retarded the growth of the less capable workers.

Whether the worker is skilled or unskilled, time is a prime essential for good and better publicity.

**Rules for Writing Copy**—*Postage and Mailbag* quotes the following rules as having been originated by John H. Patterson, founder of the National Cash Register Company:

- 1 Know your subject
- 2 Use short words
- 3 Write short sentences
- 4 Make paragraphs short
- 5 Use big ideas
- 6 Put only one thought in each sentence
- 7 Write so that a child will understand it
- 8 Say precisely what you mean
- 9 Be brief
- 10 Be logical
- 11 Tell the truth
- 12 Never exaggerate
- 13 Don't imitate
- 14 Be enthusiastic
- 15 Write to impress the reader, not to express yourself or impress a competitor

**Three Billions a Year for Health**—*"We Spend 3 Billions a Year To Get Well, Or to Keep Well,"* says *Business Week*, in the thirteenth of a series of articles on the "American Consumer Market." A diagram, "What the Average American family spent to get well or to keep well in 1929," gives the following estimates: Doctors \$31, Dentists \$12, Home Nurses \$6, Institutions \$39, Appliances \$7, Drugs and Medicines, \$33.

A table shows year by year expenditures, 1919–1930, detailed under general headings: Services; Goods and Appliances; Medicines and Drugs. The \$3,330,000,000 estimate for 1930 was \$446,000,000 drop from the 1929 figures.—*Business Week*, 330 West 42d St., New York, July 20, 1932. 25 cents.

**United Educational Program**—This joint effort under the auspices of the National Social Work Council represents all the fields of health and social work. At present the various sections are concentrating on material for use in the community chest campaigns this fall and winter. The Health Section has already prepared several bulletins of material to be distributed to the chests by the Association of Community Chests and Councils.

Additional data from the field are requested for use in many forms of publicity intended to increase popular understanding of the significance of public health work maintained by public and private agencies.

Because of absence from the country, Dr. H. E. Kleinschmidt resigned as chairman of the Health Section of the United Educational Program, and was succeeded by Paul O. Komora of The National Committee for Mental Hygiene, 450 7th Ave., New York.

**Low Cost Diet**—A "List Of Publications On Low Cost Diet," distributed

by Social Work Publicity Council, 130 E. 22d St., New York. *Copy 4 cents.* This list, given below in full, is submitted for corrections and additions. The aim was to select widely adaptable and easily obtainable material. Some of the titles priced at 1 or 2 cents in quantity are much more attractive and usable in form, and of equal practicability to some of the locally produced cumbersome mimeographed sheets prepared for use by families.

*American Child Health Assn., 450 7th Ave., New York:*

Emergency Nutrition, by Henry C. Sherman. 4 pp. 3 cents; 10 to 24 copies, 1 cent each; lower rates for larger lots.

Food At Low Cost, by Lucy H. Gillet. 4 pp. 3 cents; 10 to 24 copies, 1 cent each; lower rates for larger lots.

*Bureau of Home Economics, U. S. Dept. of Agriculture, Washington:*

Adequate Diets for Families With Limited Income. 16 pp. *Free.*

The Family's Food at Low Cost. 4 pp. *Free.* 100 for 25 cents.

Getting the Most for Your Food Money. 4 pp. *Free.* 50 for 25 cents.

(Send cash orders to Superintendent of Documents, Washington, D. C. Lower rates for larger quantities.)

*Children's Bureau, Washington:*

How to Spend Your Food Money. 1 p. *Free.* 50 for 25 cents.

Emergency Food Relief and Child Health. 10 pp. *Free.* 50 for 50 cents. (Send cash orders to Superintendent of Documents, Washington, D. C. Lower rates for larger lots.)

*New York Nutrition Committee, 105 E. 22d St., New York:*

Feeding the Family at Low Cost. 1 to 19 copies, 5 cents each; 20 to 49, 3 cents each; 50 or more, 2 cents each.

*New York State College of Home Economics, Ithaca:*

Food at Low Cost: References to Pamphlets and Leaflets (annotated—8 titles for untrained homemaker—11 titles for social or health worker). 8 pp. Single copies *free.*

Six low cost menu memoranda (with selected recipes). 42 pp. Single sets *free.*

*Metropolitan Life Insurance Co., New York:*  
Three Meals a Day: Suggestions for Good Food at Low Cost. *Free.*

*President's Organization on Unemployment Relief, 1734 New York Ave., Washington:*  
Food and Nutrition of Our Children. 4 pp. *Free.*

*Evaporated Milk Assn., 203 N. Wabash Ave., Chicago:*

Feeding a Family at Low Cost. 13 pp. *Free.*

*National Dairy Council, 221 N. LaSalle St., Chicago:*

Living Well at Low Cost. 4 pp. *Sample free.*

*Home Economics Committee—Associated Charities, Federal Reserve Bank Bldg., Cleveland:*

A Suggestive Budget for Families of Small Income. 34 pp. 35 cents.

*Council of Social Agencies, 203 N. Wabash Ave., Chicago:*

Chicago Standard Budget for Dependent Families. Includes low cost meals and weekly food lists. Revised June, 1932. 52 pp. 25 cents.

*Family Welfare Association of America, 130 E. 22d St., New York:*

Family Budgets. (List of printed or mimeographed material from 37 cities on family budgets, food budgets, etc.—weekly cash food allowances for family of 5, reported from 21 cities—suggested reading on family budgets, etc.) 14 pp. 6 cents.

"Education and Publicity" department, *American Journal of Public Health, 450 7th Ave., New York:*

Consult files for mention of new publications—and for depression diet discussion references in public health periodicals.

Using Mail in Health and Social Work—Money raising by mail, and the use of letters in promoting an idea will be treated in the Social Service Departmental, Direct Mail Advertising Association, meeting at Hotel Pennsylvania, New York, Oct. 5-7, 1932 (Wednesday through Friday).

The Wednesday morning session will take up: How to Cut Mailing Costs and Solve Postage Problems, Layout of Letterheads and Leaflets, How to Test Mailing and Make the Most of a Direct Mail Budget, How to Build Lists, Standard size envelopes vs. baronial or monarchical size; stamped return envelopes vs. postage saver return envelopes, Typed letters vs. multigraphed; four

line fill in vs. one line fill in, How to Improve the Style of Letters Appealing For Funds. There will be no speeches. Questions will be prepared to be answered by a group of specialists.

The full program and information about the exposition will be sent upon request to D.M.A.A., 19th floor, Hotel Pennsylvania, New York.

#### EDUCATIONAL PUBLICATIONS

Some of the titles listed below will have continued value for reference by the worker in health education.

A single copy of one of them sent to a newspaper editorial writer may prompt an effective editorial. A prominent business man or a leader in the community may welcome a copy of one of the listed titles.

A few copies from this list may bring as significant results as some effort costing much more in money and time.

"Are We Becoming Overly Health Conscious?" by John Sundwall, M.D., University of Michigan, Ann Arbor. Reprint from *Journal of Health and Physical Education*. Oct., 1931.

My answer is emphatically, No. Moreover I am going to try to convince you that the dawn of a much needed era of health consciousness is just appearing on the horizon.

"The Medical Charlatan: Exploiter of the Sick-Well-Ignorant-Credulous"; "The Case Against Prostitution"; "The Truth About Syphilis and Gonorrhea"—three of a series of four 12-page folders well done for reaching leaders in various walks of life. Note the paper, type, lay-out and folds. American Social Hygiene Assn., 450 7th Ave., New York. 5 cents each. Quantity prices.

"Cancer and Its Care: A Handbook

for Nurses," American Society for the Control of Cancer, 25 West 43d St., New York. 47 pp. Free. The bibliography lacks the information as to publishers, paging, and prices to be found in the other recent publication of the society. It is dated.

"Education," Supt. of Documents, Washington. Free. Revised list of government publication. See "Health Education," "Sex Education," "Nurses," etc.

"Annual Medical Service," by Rorem, Julius Rosenwald Fund, 900 S. Holman Ave., Chicago. Free.

"The Costs of Medicines," by Rorem and Fischelis; and "The Healing Cults," by Reed. Committee on the Costs of Medical Care, 910 17th St., N. W., Washington, D. C. Free.

"Free Publications of the Evaporated Milk Assn.," 203 N. Wabash Ave., Chicago. Revised list of publications. Free.

#### ECONOMIES

The careful placing of single copies or small quantities of selected articles, reprints, or pamphlets may win community leaders more effectively than more widespread efforts. More than ever does it seem desirable to win the key men and women of the community. Every month this department tells of publications valuable for this purpose.

"Submitted as an example of money saving" we have received a one-sheet mimeographed condensation of the annual report of the Iowa Tuberculosis Assn., Des Moines.

"Retrenchment—in the spirit of the times it has been deemed wise temporarily to reduce the issues of *Pennsylvania's Health* (State Dept. of Health) to one-half its usual size."

## BOOKS AND REPORTS

**Maternity Handbook**—By the *Maternity Centre Association of New York City*. New York: Putnam, 1932, 178 pp. Price, \$1.00.

Any maternity handbook got out by the Maternity Centre Association is bound to be good: this one with its wealth of detail and of illustration is something which every prospective mother should have. Nurses, too, will find it most useful, more particularly because of the many points of technic brought out. The diction employed is simple, colloquial and clear. Beginning with an introduction, the theme of which is "teamwork by mother, father, doctor, nurse, keeps most mothers well and comfortable," the book goes on to discuss the hygiene of pregnancy, the balanced diet, clothing for mother and baby, hospital and home deliveries, the after-care of mother and baby, and training the baby.

The one jangling note of the book is struck in the preface where the unqualified statement is made that "Barring the few rare and unpreventable accidents, women who have proper care throughout pregnancy, when their babies are being born, and afterwards, do not die." Such a pronouncement, while doubtless cheering to the patient, needs considerable qualification at present to be scientifically accurate.

MERRILL E. CHAMPION

**The Administration of Regulatory Inspectional Services in American Cities**—By *Edna Trull*. New York: *Municipal Administration Service*, 1932, 184 pp. Price, \$1.00.

A mass of materials has been collected portraying the inspectorial services of 38 cities which have been used as a basis for the study. The statistics were

gathered in 1931 and represent the practice of 1930. The cities were selected with a view of obtaining a cross-section in population, in geographical distribution, and in form of government. The report should be of special interest to the health organizations of those cities which participated and no pretense has been made of collecting practise methods from all cities.

It is recognized that there are now many inspectorial services which clutter up and encumber the personnel and finances of health departments which do not have any real health foundation. Not only are most health departments dealing with matters which are distinctly a health menace but they have been forced to give attention to nuisances which are merely offensive to sight or smell and not inherently dangerous.

For the cities in the study much valuable detailed information is presented, affording comparisons in methods, intensity of service, and proportion of personnel to population. There are included several good examples of routine record systems. In fact, this book fills a unique need which has not been previously met and we commend the book to the attention of all public health administrators.

HENRY F. VAUGHAN

**Diet and Weight Control**—By *Shirley W. Wynne, M.D.* New York: *Liveright*, 1932. 223 pp. Price, \$1.00.

This volume is evidently written to meet the need of that vast majority of the population who are able to read but incapable of any more complex mental process. This group, or should one say horde, constitute the mystics who believe in bath salts, rolling pins, etc., as



a means to promoting health and the fashionable figure. Evidently Dr. Wynne has the woman in direct focus since he uses 150 lb. as example of obesity in a person whose ideal might be 120 lb.

The book includes both a regimen for losing fat and also for gaining it. The lower diets for reduction are on a 1,300 calory basis. Many fat persons do not begin to lose until the diet is below 1,000 calories daily.

The general treatment of the scientific aspect of nutrition is as clearly stated as possible in a book of this kind. The method recommended, while not new in principle, is given in sufficient detail so that no excuse for infractions of diet is possible. The person who contemplates a diet regimen is amply warned that new habits must be formed; in effect that the regimen is a life sentence. Indeed, the writing of this sort of book is sufficient evidence of incurable optimism; a number of clinics have recently reported the results of "follow up" studies on obesity patients and these indicate that only a small percentage of patients successfully "reduced" had not regained the lost pounds in 2 years. The common reason seems to be lack of self control—not a rare human trait.

One feature of the volume merits note: Wynne brands some of the much advertised "cures" for what they are—brazen frauds. One could wish he had been more emphatic since his position carries authority. The money mulcted from the people in this business spells dividends even in depression.

NELLIS B. FOSTER

**Prevention of Disease in Childhood**  
—By Paul L. Parrish, M.D., F.A.C.P.  
New York: O. E. Saunders & Sons,  
1931. 89 pp. Price, \$1.00.

This is a small book written, so the preface says, for the guidance of young or inexperienced mothers and the emphasis is evidently intended to be

placed on prevention. This makes it of especial interest to public health workers and gives the latter the right to judge its statements in the light of public health knowledge of the present day.

Some features of the book are very good: it has a complete table of contents and the reading matter is well broken up by the use of headings. Also it is brief and mostly, though not entirely, free from technical terms.

When we come to the public health aspects, however, several criticisms may justly be made. For instance, the subject of immunization is treated without any mention being made of toxoid as an alternative to toxin-antitoxin. Milk is discussed as if the only information available were that of several decades ago. If the writer ever had been a health officer he would not have made the ingenuous statement, "in a country such as this, where good, pure raw milk can be obtained, it (that is, pasteurized milk) has little place in infant feeding." Pasteurization is said to consist "in heating the milk to 160° for 20 minutes" and to make matters worse, even this temperature, according to the author "does not kill tubercle bacilli." Over-emphasis is placed on the destruction of vitamins by heat. Grade B milk is referred to as if it were the only alternative to certified milk.

Since other manuals are available, as simple and more accurate, one's choice would not fall on this one.

MERRILL E. CHAMPION

**Medical Entomology.** A survey of insects and allied forms which affect the health of man and animals—By William A. Riley and Oskar A. Johannsen. New York: McGraw-Hill. 476 pp. 184 figs. in text, 1932. Price, \$4.50.

This is an entirely rewritten edition of the authors' *Handbook of Entomology*, published in 1915. Instead of dividing the subjects into the general

topics of poisonous, parasitic, and vector insects, the authors have treated the insects and related animals in their systematic groups, though not in the usual systematic order.

The early and later history of the relations of arthropods to disease is briefly reviewed in the opening chapter. This is followed by a discussion of the ways in which arthropods affect health. The arachnids come first in the systematic discussion, including the poisonous "black widow" spider, solpugids, scorpions, chiggers, itch and hair follicle mites, and the ticks, especially the carriers of Texas fever, Rocky Mountain spotted fever, tularemia, Oroya and relapsing fevers.

The insects proper are then taken up in the accepted sequence, beginning with body, head, and pubic lice in relation to typhus and trench fever. This is followed by a discussion of the true bugs, or *Hemiptera*, including the bed bug and the assassin bugs, especially the carrier of Chagas' disease. The beetles (*Coleoptera*) are concerned only to a very limited degree as facultative parasites, as vectors, or as poisonous species, and *Lepidoptera* mainly as the source of irritating or poisonous scales or hairs. The *Diptera* play a much larger part, the sand flies (*phlebotomus*) being implicated in 3-day fever, Oroya fever, verruga peruviana, Carrion's disease, and more recently in the Leishmanioses, kala azar, and oriental sore; the mosquitoes in malaria, filariasis, yellow and dengue fevers; and flies in typhoid, and various myiasis; and fleas in plague.

The book is a mine of carefully selected, well organized, and clearly stated information about insects in relation to disease, control and preventive measures, and the essential biological facts pertaining to understanding these relations. Keys for determination of important species are included and an extensive bibliography and index are provided. It is an invaluable text book and a very

useful work of reference for the public health worker and for the laboratory.

C. A. KOFOID

**An Introduction to Materia Medica, Drugs and Solutions—By Stella Goostray.** (3d ed.) New York: Macmillan, 1931. 214 pp. Price, \$1.75.

The third edition of Miss Goostray's *Introduction to Materia Medica, Drugs and Solutions* (September, 1931), makes a very helpful book for the young teacher. The subject matter has been rearranged somewhat, to give the student a more interesting approach. The sequence is logical and the content adequate for an elementary course in materia medica.

Interesting references, suggested exercises, and blank pages for the use of the student, add to the practical value. It is small enough to be carried about by the private duty nurse, a point also in its favor, making a rather comprehensive review of commonly used drugs, their dosage and action. "Multum in parvo," we would say of this little book.

HANNAH STEVENS.

**The Science of Human Living—By Mae Johnson Corwin and Walling Corwin.** San Francisco: Harr Wagner Publishing Co., 1931. 464 pp. Price, \$1.68.

The authors have added another excellent volume to their science series. This book has been prepared for junior high school students and it is written in an interesting and flowing style. It is a text that combines physiological facts and health education. It vitalizes technical physiological knowledge by showing how it can be put to practical use in daily healthful living. The book covers a wide field, including sections on personal hygiene, public health, approved health habits, mental health, home sanitation, infant welfare, and home nursing.

The student is introduced to personalities who by perseverance and right living have developed strong, healthful bodies and to men and women who have contributed to the science and promotion of public health.

Diagrammatic illustrations, specific examples illustrating the subjects discussed, and enough statistics to be impressive yet not burdensome add to the value of the text. A lesson plan is incorporated in each chapter and the comprehensive index and bibliography will be aids to the teacher and pupil.

This book should enrich the well-being of every boy and girl who reads it.

A. B. TOWSE

**Elementary Bacteriology**—By *Joseph E. Graves, Ph.D., and Ethelyn O. Graves, M.D.* 2d ed. Philadelphia: Saunders, 1932. 535 pp. 130 ill. Price, \$3.50.

The changes and additions in this second edition have necessitated a slight increase in the number of pages, but the original plan of the book has been preserved. The chief additions are in the sections dealing with milk, butter, water, the bacteriophage, and the application of bacteriology to arts and industries. Some new and good illustrations have been added. The fundamentals of bacteriology are presented in a full and interesting manner which should hold the student's interest. The historical treatment of various phases of the subject are particularly to be commended. The make-up and printing of the book are excellent.

FRED O. ADAMS

**Public Health Organization**—*Report of the Committee on Public Health Organization. A Publication of the White House Conference.* New York: Century. 338 pp. Price, \$3.00.

This report includes, in addition to an introductory statement, sections on rural, city, state, federal, and non-official public health organization, to-

gether with chapters on the Training of Personnel, the Administration of Child Health Work as Part of Official Health Programs, Relation of Practitioners of Medicine and Dentistry to Health Programs, Health Aspects of Food Control, Research, and a final chapter of Recommendations.

Each section contains a summary of findings and conclusions, a somewhat detailed discussion of types of organization and service, and the extent to which various types of organizations and services are carried on. For those desiring even more specific detailed information, there are numerous tables giving the states, counties and municipalities carrying on various types of service; increases or decreases in such services in recent years; and per capita expenditures and salaries of some of the more important administrative positions. The data covered are for the year 1929. For the most part, the years 1923 to 1929 are included, although in some instances information is available from 1915 to 1929.

Among the many important conclusions are:

Rural health departments should be based upon the county unit, and should be an integral part of the county government. For counties where the population is too small, or the financial resources inadequate to justify a separate organization, some plan of uniting with other counties to form a larger health district should be devised.

The system of state and federal subsidies to promote and maintain county health departments has proved its utility and should be extended.

There should be better coördination in the expansion of consultant service to local health departments, and state and federal public health services should play a leading part in the performance of such service.

Some activities now included in the program of most health departments can be transferred gradually to the general practitioner of medicine. In the interest of child health, in so far as practical, the family physician should become a practitioner of preventive as well as curative medicine.

The experience of the municipal departments

has demonstrated conclusively that programs for the improvement of the health of the mother and child can be conducted successfully only as part of the general program of a well organized health department.

The health officer of any governmental unit must be recognized as the one person directly responsible for the health of the people in his district. . . . It is the primary duty of the nonofficial agency to support and aid him in his difficult task.

The nonofficial agencies in a given community should join together in a health council, preferably under the chairmanship of the health officer or his representative. They should make a serious study of their common problems and relationships and reach definite agreements as to the sphere of each.

These are but samples of the many important conclusions of the committee. Every person interested in public health organization and administration, particularly every health officer, will find this publication a most important reference book. CARL E. BUCK

**Social Work Administration—***By Elwood Street. New York: Harper, 1931. 466 pp. Price, \$3.00.*

The principles underlying successful social work administration are discussed in a comprehensive manner in this book which is one of the Harper's Social Science Series. The book deals with a wide range of subjects, including administration, organization committee management, the choice and equipment of an office, the selection of personnel and policies, budget making and control, statistics in administration, and team work between agencies. Organization charts and other graphic methods are illustrated. This volume should prove useful as a guide to administrators of social agencies and of other types of organizations. The observations and experiences may be adapted to local needs and opportunities. IRA V. HISCOCK

**The Insect Menace—***By L. O. Howard. New York: Century, 1931. 374 pp., 64 ill. Price, \$3.50.*

This volume was written for the pur-

pose of arousing the public to an appreciation of the insect menace. With this in mind, the author has presented his appeal in nontechnical language, and has used numerous examples, derived from the literature as well as his own observations, to illustrate his conception of the insect menace to man. It is a very interesting account of the ravages of insects, of the development of methods of biological, mechanical, and chemical control.

The author points out that insects have been in existence some 40 million years or more as compared with about 400,000 for man. Since the generation time of insects is so much shorter than that of man, insects have had 12,500 times the opportunity to develop forms suitable for their preservation. Other advantages of insects, such as the superiority of their anatomical structure, size, protective coloration, rate and types of reproduction, and more rapid digestion of food, are described. The one possible advantage of man over insects, he states, is in the nervous system.

As interesting examples of specialization of aquatic insects, the author speaks of the dragon fly as an "animated fly trap," and calls a species of water bug an "animated baby carriage."

The multiplication of a number of serious insect pests, such as the European corn borer, the clover-seed midge, and the cotton boll-weevil, is attributed to the agricultural methods being employed. These and other pests have increased because man has made more food available. The monetary loss during 1920 in the United States from insects has been estimated at more than \$2,200,000,000, which does not include the losses resulting from diseases of man transmitted by insects, which cannot be estimated with accuracy. Such diseases as malaria and yellow fever result in enormous labor losses and sometimes loss of commerce.

In order to combat the depredations of insects, studies are being made of their life histories to determine what variations in cropping methods will tend to decrease the chances of insects increasing in numbers. Other studies are being made to find and utilize secondary parasites for control. The narrative telling of the introduction and rearing of insect parasites to prey upon other insects is very interesting. These and other studies have already provided some measures for the control of important insect pests.

The author suggests that if the wastes caused by insects could be prevented, there would be no need for birth control measures to prevent an over-population of the world. An abundance of anecdotes and illustrations serves to prevent the reader from becoming depressed by realization of the seriousness of the insect menace.

The standing of the author assures the substantial accuracy of the statements in the book. It can be recommended to all readers, professional or otherwise, without hesitation.

NEWELL R. ZIEGLER

*Problems of City Life*—By Maurice R. Davie. New York: Wiley, 1932. 732 pp. Price, \$4.25.

This volume represents an intensive study of modern city life, from the viewpoint of urban sociology. It emphasizes normal conditions in dealing with both physical and human environment. The book is divided into 5 parts of 3 to 6 chapters each. Following a consideration of the modern social en-

vironment, the growth of cities, city planning, the traffic problem, and housing, in Part III 6 chapters are devoted to an understanding discussion of health. Parts IV and V, respectively, deal with Education and Recreation.

The author has succeeded in presenting the subject of health in relation to other sociological factors in a well balanced, forceful manner. Health workers who are considering their relationship to other community activities, and persons who are engaged in educational and recreational activities, as well as students of sociology, will find this an interesting and valuable reference.

IRA V. HISCOCK

*A Child's Book of the Teeth*—By Harrison Wader Ferguson, D.D.S. Yonkers, N. Y.: World Book Company, 1932. 106 pp. Price, \$.68.

This is a revised and enlarged edition of a charming little book which ought to interest parents and teachers as well as children. The illustrations, which are by the author himself, are amusing and clever as well as instructive. Adequate emphasis seems to be given to diet in its relationship to teeth and at the same time the subject of cleanliness is not overlooked. The toothbrush drill is retained, though not perhaps in its pristine glory. A good deal of ritualistic hokum that used to attach to this device, though presumably it has some teaching value.

The book can be heartily recommended to all who are concerned with teaching dental hygiene to children.

MERRILL E. CHAMPION

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Heart Disease**—"In New York City, for the population as a whole, there is no evidence of any increase in the real death rate from heart disease." Let the viewers-with-alarm take note.

BOLDUAN, C. F., and BOLDUAN, N. W. Is the "Appalling Increase" in Heart Disease Real? *J. Prev. Med.*, 6, 4:321 (July), 1932.

**Finding Tuberculosis Early**—Modern tuberculosis case-finding calls for tuberculin testing all children and X-raying the reactors; where X-rays are suspicious a complete physical examination is indicated. So concludes this excellent Detroit study.

BRACHMAN, D. S. Modern Case-Finding in Tuberculosis. *Am. Rev. Tuberc.*, 26, 1:89 (July), 1932.

**Physical Impairments and Longevity**—Included in this important study are a list of physical impairments found in "well" adults, defects considered not sufficiently serious to exclude the victims from life insurance but which did result in excess mortality.

BRITTEN, R. H. The Physical Impairments of Adult Life; Association with Subsequent Rates of Mortality. *J. Prev. Med.*, 6, 4:249 (July), 1932.

**Measures of Health**—The conclusions of this critical summary of medical examination records—that statistics derived from health examinations are valueless as *absolute* measures of health but are of incalculable value in their *relative* comparisons—make the paper one which every health worker should take to heart.

BRITTEN, R. H., and GODDARD, J. C. A New Measure of the People's Health. *Milbank Quart. Bull.*, 10, 3:223 (July), 1932.

**Smallpox Mild and Severe**—No evidence can be found to indicate that mild smallpox has ever reverted to the

classical type. The many outbreaks of the severe form probably are due to importations. These conclusions may well be remembered by vaccination propagandists who will still have plenty of ammunition.

CHAPIN, C. V., and SMITH, J. Permanency of the Mild Type of Smallpox. *J. Prev. Med.*, 6, 4:273 (July), 1932.

**Endemic Typhus**—Evidence pointing to the rat flea as the common vector of endemic typhus from rat to rat and rat to man is summarized. It is suggested that epidemics of louse-borne typhus may have their origin from infection transmitted from rat to man by fleas.

DYER, R. E., *et al.* Endemic Typhus Fever in the United States. *J. Infect. Dis.*, 51, 1:137 (July-Aug.), 1932.

**Smallpox in Fitchburg**—Only 3 of 60 cases of smallpox occurring in the Fitchburg (Mass.) epidemic had been vaccinated before exposure and none of these had been vaccinated within 45 years. Yet the antivaccinists (from other towns who weren't exposed) raged as usual.

FEEMSTER, R. F., *et al.* The Recent Smallpox Outbreak in Fitchburg. *New England J. Med.*, 207, 2:82 (July 14), 1932.

**School Children's Ears**—In a group of nearly 10,000 children, 3.5 per cent showed definite defective hearing. Among them were many with hypertrophied and infected tonsils and adenoids. That this condition cannot be ignored by school authorities is a reasonable conclusion.

FREUND, E. M. Hearing Survey, Public Schools, Albany, N. Y. *New York State J. Med.*, 32, 13:791 (July 1), 1932.

**Heresy About Colds**—Findings that will make the health propagandist

tear his hair are reported in this paper: There was no significant difference in the number or severity of colds suffered by a group of persons who slept with windows only partially open as compared with another group of fresh air enthusiasts who threw their windows wide.

The same was true of groups of persons that exercised outdoors less than 8 and more than 8 hours per week in summer and less than 4 and more than 4 in winter.

GAFNER, W. M. Hardening Procedures and Upper Respiratory Disease (Common Cold). *Am. J. Hyg.*, 16, 1:233 (July), 1932.

**Amebic Dysentery Test**—Studies are reported which show complement fixing substances in persons suffering from amebic dysentery.

HEATHMAN, L. Studies of the Antigenic Properties of Some Free Living and Pathogenic Amebas. *Am. J. Hyg.*, 16, 1:97 (July), 1932.

**Tuberculosis and Pregnancy**—“From the evidence obtained from a study of 470 cases of pulmonary tuberculosis, we conclude that pregnancy does not have a marked effect on the progress of tuberculosis. In fact, the evidence is striking that the phenomena are independent of one another.” So concludes the second of two papers, the first of which finds abortion rarely indicated if adequate treatment is given in pregnancy.

JENNINGS, F. L., *et al.* Pregnancy in the Tuberculous. *Am. Rev. Tuberc.*, 25, 6:673 (June), 1932.

**Mottled Enamel**—The continuous use of domestic water containing 2 p.p.m. of fluorine will result in interference with enamel calcification of the teeth, and the damage will be permanent and irreparable. The only solution is the abandonment of a fluorine tainted water supply.

McKAY, F. S. Tooth Enamel Mottled by

Water. *Water Works Eng.*, 85, 13:790 (June 29), 1932.

**A Milk-Borne Paratyphoid Epidemic**—This Canadian epidemic was caused by faulty operation of a pasteurizing plant which permitted raw milk to be bottled by mistake. The need for adequate supervision of pasteurization is amply demonstrated.

McKAY, A. L., *et al.* An Epidemic of Milk-Borne Paratyphoid Fever. *Canad. Pub. Health J.*, 33, 7:303 (July), 1932.

**Changing Diets**—The author says: “There are signs that many of our adolescents are growing somewhat more rapidly than in former generations. Is this an outcome of our modern education and advertising? Is it a wholesome trend? It is too early to answer these questions with conviction; but it suggests that our menus have indeed changed.”

MENDEL, L. B. The Changing Diet of the American People. *J. A. M. A.*, 99, 2:117 (July 9), 1932.

**Temporary Sanitation**—Sanitarians who may some time be faced with the job of providing temporary sanitary conveniences for large crowds will wish they had read this account of the experience at Yorktown, Va., when 120,000 persons descended upon a town of 480 souls.

MILLER, A. P. Keeping a Celebration Area Clean. *Munic. San.*, 3, 7:280 (July), 1932.

**Gonorrheal Vaginitis**—This symposium on the subject of gonorrheal vulvovaginitis considers the problem from the standpoint of the clinician, the institution, the pediatrician, and the school physician.

NELSON, N. A., *et al.* Gonorrheal Vulvovaginitis. *New England J. Med.*, 207, 3:135 (July 21), 1932.

**Sinuses and Colds**—The conclusion of an X-ray study of nasal sinuses is

that there is no evidence of association between the size of the frontal sinus and the number or duration of attacks of the common cold.

PALMER, C. E. Relation Between Size of Frontal Nasal Sinuses and (1) Attacks of Upper Respiratory Disease (Common Cold) and (2) Certain Nose and Throat Conditions. *Am. J. Hyg.*, 16, 1:224 (July), 1932.

**Childhood Mortality Trends**—The infant mortality rate in upstate New York declined 33 per cent from 1915 to 1928, whereas the drop in the death rate in the age group 1-4 was considerably greater, 47 per cent. After a lot of statistical study the conclusion is reached that those children in the pre-school group are not receiving as much care as infants and school children. If this is so, they certainly seem to thrive on neglect.

PARKHURST, E. Trends in Childhood Mortality in New York State (exclusive of New York City). *New York State J. Med.*, 32, 13:785 (July 1), 1932.

**Drug Addiction**—This epidemiologic study of drug addiction points out that there are both a local and a general responsibility for preventive measures. The federal program is described.

TREADWAY, W. L. Drug Addiction and Measures for Its Prevention in the United States. *J. A. M. A.*, 99, 5:373 (July 30), 1932.

**Dissolved Oxygen Determination**—The Winkler method of determining dissolved oxygen is described in working detail in this committee report.

THERIAULT, E. J., *et al.* The Determination of Dissolved Oxygen by the Winkler Method. *Sewage Works J.*, 4, 3:413 (May), 1932.

**Health Economics**—Here is the promise for a solution to the vexing problems of providing medical care. If intelligent leadership can be given to the forces of social discontent, improved medical and health services may result; so says the Chairman of this highly important commission.

WILBUR, R. L. The Economics of Public Health and Medical Care. *Milbank Quart. Bull.*, 10, 3:169 (July), 1932.

**Fertility of White Women**—"All this evidence seems to show that an important . . . cause of the rising fertility of native-white women since 1900 . . . has been the slow permeation of the class of native-white women within the present century by American-born daughters of foreigners carrying some part of the high fertility of their stock and thus counterbalancing the tendency to a fall in the birth rate of native-white women . . ."

WILCOX, W. F. Changes Since 1900 in the Fertility of Native-White Wives. *Milbank Quart. Bull.*, 10, 3:191 (July), 1932.

## BOOKS RECEIVED

YOUR TEETH AND THEIR CARE. By Carl W. Adams. St. Louis: Mosby, 1932. 141 pp. Price, \$1.25.

MILK PRODUCTION AND CONTROL. A Publication of the White House Conference on Child Health and Protection. New York: Century, 1932. 392 pp. Price, \$3.00.

PASTORAL PSYCHIATRY AND MENTAL HEALTH. By John Rathbone Oliver. New York: Scribner, 1932. 330 pp. Price, \$2.75.

THE WISDOM OF THE BODY. By Walter B. Cannon. New York: Norton, 1932. 312 pp. Price, \$3.50.

LEAGUE OF NATIONS. HEALTH ORGANIZATION.

Report of the Reporting Committee on Maternal Welfare and the Hygiene of Infants and Children of the Pre-School Age. Boston: World Peace Foundation, 1931. 75 pp. Price, \$.50.

DIRECTORY OF CLINICS AND HEALTH STATIONS. New York: New York Tuberculosis & Health Association, 1932. 661 pp. Price, \$.40.

THE PURCHASE OF MEDICAL CARE THROUGH FIXED PERIODIC PAYMENT. By Pierce Williams. New York: National Bureau of Economic Research, Inc., 1932. 308 pp. Price, \$3.00.



# NEWS FROM THE FIELD

## N.T.A. RESEARCH FELLOWSHIP ANNOUNCED

THE National Tuberculosis Association announces Mary E. Bateman as the Research Fellow for the year 1932-1933. Miss Bateman, who has for the past year been connected with the New York State Department of Social Welfare, at Albany, will be a member of the National Tuberculosis Association Committee on Social Research.

## DELTA OMEGA PRESENTS SCROLL AND KEY TO DR. RAVENEL

MAZÏCK P. RAVENEL, M.D., at the banquet of the Delta Omega at Ann Arbor, where he gave an address in July, was presented with the scroll and key of the organization. He is the ninth person who has ever had this conferred upon him.

## HARTLEY AWARD TO DR. PARK

THE public welfare medal, for eminence in application of science to public welfare, was awarded to Dr. William Hallock Park, Fellow A.P.H.A., of New York, for his work as head of the Research Laboratories of the New York City Health Department and as a leader in research and application of scientific discoveries to prevention of disease. This medal is awarded from a fund established in memory of Marcellus Hartley.

## MICHIGAN MIDSUMMER CONFERENCE

THE Midsummer Conference of the Michigan Public Health Association was held in conjunction with the week-end institute at the University of Michigan, Ann Arbor, Mich., July 16. Among the subjects discussed were Heart Disease, Milk, Health Insurance, Dental

Health Service in Schools, and Typhoid Fever. Dr. Ravenel gave an address on Milk.

## PERSONALS

DR. ARTHUR M. JOHNSON has been appointed Health Officer of Rochester, N. Y., to succeed Dr. George W. Goler who resigned on July 1, after 35 years of continuous service. Dr. Johnson has been connected with the Rochester Health Bureau for some time.

MIGUEL CESPEDES ACOSTA, M.D., of Havana, Cuba, member A.P.H.A., was recently appointed Secretary of Sanitation and Charities of the Republic of Cuba. In the announcement of this appointment it was stated that there will be "no political interference in public health affairs, improving the tenure of public health works and an honest administration."

## CONFERENCES

September 6-9, International Union Against Tuberculosis, The Hague.

September 12-19, American Hospital Association, Detroit, Mich.

September 26-October 1, National Congress of Parents and Teachers National Board of Managers, Chicago, Ill.

October 3-7, Twenty-first Annual Safety Congress and Exposition, Washington, D. C.

October 22-24, Conference of State Sanitary Engineers, Washington, D. C.

October 24-27, 61st Annual Meeting, American Public Health Association, Washington, D. C.

November 14-18, Tenth Annual Short School, Texas Public Health Association, Dallas, Tex.

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# American Journal of Public Health and THE NATION'S HEALTH

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Volume XXII

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Number 10

## Participation of Lay People in the Promotion of a Rural Child Health Program\*

ELMA ROOD, R.N.

*Director of Health Education, Children's Fund of Michigan,  
Detroit, Mich.*

CONDITIONS in the rural field of child health point toward a coöperative program as the only one that can really reach every child. Because the rural territory is large, and the facilities to cover it are small, the limited professional personnel is faced with the overwhelming task of trying to bring a health service to scattered families in isolated districts. Health workers are often under the additional handicaps of inadequate budgets to cover expenditures, and large numbers of children requiring assistance, due not only to the scarcity of medical and dental service, but also to the fact that the poverty of many families makes it impossible for them to provide corrective work.

Child health work is never completed in any community, since each year new children are added to the population, and the health forces must try to keep abreast of a steadily moving procession of children, many of whom live long distances from the health centers. Thus it is that the only possible way adequately to reach these children is to multiply the influence of professional groups by enlisting the coöperation of the people of the local community.

Many procedures which trained workers have formerly believed belonged exclusively within their province, can be done equally well

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\* To be read before the Child Hygiene Section of the American Public Health Association at the Sixty-first Annual Meeting at Washington, D. C., October 27, 1932.

by an intelligent lay person (one who has had no specialized training in that particular field). So, in order that the public dollar may go as far as possible, professional workers should ascertain the minimum number of procedures that they must carry on personally, and turn over all others to competent citizens. Then too, lay people have a much greater appreciation of the importance of a service after they have participated in it; therefore, the time spent in educating local leaders is well spent, when measured in terms of increased service to the child.

It is from the community itself, then, that its own greatest good can come, since Mrs. Everybody and Mr. Ordinary are in the majority and can help more than they realize. For example, they can care for the transportation of indigent children to places where various types of health service are available. When physical examinations are being given in a community center; when dental clinics are operating; when a station for immunization has been opened, half the battle for health is won. But only half, for, how are the children who live from 4 to 10 miles from these advantages to derive any benefit from them? With the public health officials working to capacity, the hours spent in conveying children to and from such centers are sacrificed from other professional duties for the children. Then it is that a volunteer transportation service is instituted by some competent citizen who is willing to contribute his or her car and a morning a week to the cause, thus insuring to every child in the district the best health advantages that the community offers.

For the citizen who is eager to help and has no car, there are various other tasks. In districts where there are poverty stricken families, intelligent women can carry on relief programs under the supervision of the child health committee or some social agency, if there is one. They can promote child health by reporting to the authorities all children who should be classed as indigent. They can gather and remake clothing to outfit these children, thus protecting them from possible illness due to exposure.

Many bands of community women have utilized their social gatherings for worthwhile purposes and have contributed labor, and raised the necessary money to support such enterprises as providing undernourished children with milk and cod liver oil, and preparing materials for loan closets, layettes and maternity kits.

All citizens can participate in reporting special cases requiring attention, thus enabling the health authorities to work to greater advantage, because the community itself has become an information bureau. Another indispensable factor is that of publicity. Every

interested parent in a rural district who acquaints the public with the value of child health work is furthering the cause. This enthusiastic and optimistic oral propaganda is far reaching in its effects, and supplements the work of the local newspaper.

Occasionally the small centers come together in a county-wide celebration or assembly (as May Day) and each district interprets to the others its own progress in carrying out the health program. Such an exchange of suggestions is stimulating and helps the local leaders to see their parts in the whole scheme, and to visualize the broad field that the health service offers.

Apart from the average citizens, it is assumed that the county officials and administrators will contribute much to the success of the program. School superintendents arrange for space and time for health procedures, and other officials work shoulder to shoulder with the entire community in the interest of the children.

Then there are the teachers. Their influence is an especially broad one because they have daily contacts with so many children. The resourceful teacher makes a survey of the physical condition of the children and the school environment early in the year, and makes immediate adjustments for special cases and conditions disclosed. She utilizes, as opportunities of teaching, the daily events and problems which arise in the school, thus enabling pupils to coöperate intelligently in the prevention and care of colds, epidemics and accidents. She seeks to combat undernourishment in children by instituting hot lunches, and she endeavors to instil in each child the desire to be in as perfect a physical condition as is possible.

In her contacts with the parents, the teacher often educates them in special phases of the school health program such as physical examinations and immunity treatments. For the protection of the community, the teacher reports any signs of departure from normal health which may appear in the classroom from day to day. She can often give valuable information regarding the particular needs of certain children, and her word carries weight in an interview with the county officials in the interest of special cases. The alert, interested teacher can in these and in innumerable other ways interpret the health service to the entire district and help it to function efficiently.

These are some of the ways in which officials, teachers, and citizens can work together in the common cause. The extent to which lay people actually participate in the program depends upon a variety of factors, some of which are inherent in the community, and some of which may be developed. A neighborly interest, with a

desire to be of service to others, is latent in almost every district. It manifests itself readily in times of disaster, because the emotions are involved; but in the everyday occurrences in the community, the citizens are inclined to be casual until some threatened danger brings matters to a crisis. This driving force which is so potent in time of stress and strain should be called into action when there are less dramatic situations demanding help. When people are brought to realize fully that undernourished children who are in their midst continually are literally starving, or that those who are laboring under various handicaps of vision or hearing, are really suffering, they will work together with the same neighborliness and sympathy which they exert under more dramatic circumstances.

A friendly spirit built up between the health workers and the people is absolutely essential, and both should feel that they are coworkers in a common cause, and realize that the success of one is very much dependent upon the assistance of the other.

An organization for work is another prerequisite, and it should reach even the most remote rural areas. Potential executive ability in the community should be recognized in this organization, and increasingly given new responsibilities for the management of selected projects. The professional group too must have good leadership if things are to be accomplished. A good leader must be able to define aims clearly, to point out the best road leading to the community's goal, and he must be able to select and to detail many responsibilities to others. The contributors must see their parts in the realization of the end result, and feel that their participation has been worthwhile and is appreciated.

Finally, the professional group should give generous recognition to the lay service; in speeches or messages the officials should avoid the personal pronoun "I," and in discussing accomplishments should say "we" or "they" (the lay people) "have done these things." Newspaper articles and official reports should keep the spotlight on the people whenever possible in order that the public may realize that it is absolutely indispensable in the program. In this way, the citizens will be brought to realize that they hold in their hands the physical condition of their own and their neighbor's children, and that with the proper spirit of coöperation and coördination among themselves and with the authorities, the possibilities are infinite for insuring a high degree of health for the maximum number of children.

Some of these "infinite possibilities" are being realized, and in isolated districts where one might least expect to find a coöperative interest in health. For example, there is Pumpkin Creek's loan closet

mothers for their first visit to the school. The toddlers were given a complete health examination; luncheon consisting of orange juice and animal crackers was served for them; and the mothers were advised as to the proper food and care of preschool children. The adventure was an unqualified success, and has become an annual event that these children may be kept healthy and fine until they are added to the school population.

In a poverty stricken consolidated district the school principal was appalled by the high percentage of children who were under-nourished. Many of them were actually hungry, because the meager little farms on which they lived had gone to seed, and the depression had made it impossible for their farmer fathers to realize any profits on their products. The principal decided that it was the school's responsibility to see that every child had at least one good meal every day. Accordingly, he had a canvass made of the entire district, each home checking the farm produce which it could contribute to a hot lunch for the children. On the basis of this, he worked out a schedule for meals costing 3 cents apiece, and for the entire year 285 children had a hot meal every day. The home economics girls did the work and 95 per cent of the homes coöperated with donations of potatoes, milk, turnips, carrots, and beets. All of the children gained noticeably and the parents were delighted. When the principal sent around a questionnaire to see whether the district wished to continue "feeding the small army" the following year, every reply was an enthusiastic affirmative, and one mother wrote delightedly: "By all means! All of the children are fatter, especially Beulah!"

So we see that the "learning by doing" theory in education, which is coming to be generally accepted in childhood education, is thus beginning to be recognized as equally valuable in educating adults to the problems about them and how to solve them most effectively.

These, then, are the actual by-products of coöperative enterprises, and in terms of child health their value is inestimable. Small armies are fed; the toddlers are inspected, and a checking account is opened in the community. And in every case the district shows a marked improvement; the general community is healthier, and the layman learns that he does not need specialized training to contribute his share.

If, all over the rural areas, citizens could join hands in such a way with health departments, both would be doubly strong and their combined forces could accomplish the hitherto impossible feat of bringing maximum health to every boy and girl in the remotest districts.

# H and O Agglutination as an Aid to the Diagnosis of Typhoid Fever

ANNA DEAN DULANEY, PH.D., WALTER T. WIKLE AND  
RUBY TRIGG

*Department of Bacteriology, University of Tennessee College of Medicine,  
Memphis, Tenn.*

DURING the past year we have determined the H and O titers of 161 serums, using formalinized and alcoholized suspensions of *B. typhosus*, for the purpose of evaluating such a procedure in the diagnosis of typhoid fever. These serums represent 41 cases of clinical typhoid, 30 patients suffering from febrile, non-typhoid diseases, and 90 healthy vaccinated (antityphoid) individuals. The results of these titrations are presented in Tables I and II.

According to Felix,<sup>1</sup> most typhoid infections produce both H and O agglutinins—the H (flagellar) designating the infecting organism, and the O (somatic) expressing the body's response to infection. In the course of typhoid fever resulting in recovery, Felix demonstrated a marked development of O agglutinins early in the disease. Overwhelming infections would not permit the body to produce O agglutinins and, on the other hand, very slight infections would not offer sufficient stimulation for the development of O agglutinins to any appreciable titer. Thus the demonstration of small flaking O agglutinins in a suitable dilution of serum (1:100–1:200) has diagnostic value and, in addition, offers some prognostic information since Felix and Olitzki<sup>2</sup> regard the O agglutinin as identical with the bactericidal antibody. In vaccination only large flaking (H) agglutinins are produced. A vaccinated person suffering from some non-typhoid disease may show a stimulation of H agglutinins (anamnesic reaction), but O agglutination is only given in the course of infection with a member of the enteric group of organisms.

Felix's demonstration of high titers of O agglutinins in typhoid infections has been confirmed by Stuart and Krikorian,<sup>3</sup> Gardner,<sup>4</sup> Ecker and O'Neal,<sup>5</sup> Mudd,<sup>6</sup> and workers in this laboratory.<sup>7, 8</sup> Stuart and Krikorian also agree with him as to the lack of O agglutinins in vaccination. All other data, however, substantiate Gardner's claims that vaccination produces O agglutinins to a degree worthy of notice.



Mudd demonstrated a definite correlation between the protective power of a T.A.B. vaccine and its ability to stimulate the development of somatic agglutinins. Gardner recommends the use of higher serum dilutions (1:400) than those used by Felix to insure the diagnostic value of O agglutination.

#### PROCEDURE

*Serums*—Blood was drawn from febrile patients as soon after admission to the Memphis General Hospital as was possible. When the clinical and laboratory findings designated typhoid fever subsequent specimens of blood were taken at intervals depending on the condition of the patient and the duration of stay in the hospital. It was hoped that repeated titrations would show a relative increase in the development of H and O agglutinins. Since this hospital does not see many early cases of typhoid we were not able to demonstrate any very significant fluctuation of agglutinins, and only the results of the first titration are considered here. The 30 serums from patients suffering from non-typhoid febrile diseases serve as controls for the patients with proved typhoid. Serums for the study of the agglutination reaction in vaccination were obtained from students of the class in medical bacteriology.

*Antigens*—A 0.1 per cent formalinized antigen as recommended by Dreyer,<sup>9</sup> and an alcoholized antigen prepared according to Gardner's<sup>4</sup> method were employed for the tests reported here. A strain of typhoid isolated from the blood stream of a patient 6 months previously, and conforming to all requirements of a smooth motile form was used in the preparation of the antigens. Recently we have found

TABLE I

SHOWING H AND O TITERS OBTAINED WITH 161 SERUMS FROM VARIOUS SOURCES

Number of Serums	Source	Type of Agglutination	Number of Serums Giving Titers Indicated								
			Neg.	40	80	160	320	640	1,280	2,560	5,120
41	Typhoid Patients	H	1	1	2	6	5	11	8	3	4
		O	1		2	2	1	8	13	9	5
30	Non-Typhoid Febrile Diseases	H	15	8	5	2					
		O	19	4		4	3				
90	Vaccinated Individuals	H	8	2	8	18	21	9	18	6	
		O	17	21	29	18	5				

that 1 per cent formalinized antigens are better for detecting H agglutination than those containing lower proportions of formalin. Formalin 0.1 per cent does not entirely inhibit O agglutination and it is felt that some of our agglutinations in high dilutions of serums with formalinized antigen may in reality be O agglutination, which was not inhibited by the formalin concentration employed.

*Technic*—Macroscopic agglutinations were set up with serum dilutions ranging from 1:20 to 1:2,560. The antigen-serum mixtures (0.5 c.c. each) were incubated in a water bath at 52° C. The H agglutinations were read after 2 hours, the O at the end of 24 hours in the water bath and again after 24 hours in the refrigerator. Final readings were made by lamplight and with the aid of a hand lens.

### RESULTS

As shown in Tables I and II, there is a marked development of both H and O agglutinins in most cases of typhoid fever. The results obtained in other febrile diseases offer a marked contrast. In vaccination H agglutinins are stimulated to high titers, but O agglutinins were present in 81 per cent of the serums tested.

TABLE II

#### SUMMARY OF H AND O AGGLUTINATION IN 161 SERUMS STUDIED

##### *Serums from Typhoid Patients*

Per cent of Serums	Agglutination
2	Neither H nor O agglutination
98	Both H and O agglutination
59	Higher O than H agglutination
12	Higher H than O agglutination
27	Approximately equal H and O agglutination
87.5	O agglutination exceeding 1-500

##### *Serums from Non-typhoid Febrile Patients with no History of Vaccination*

Per cent of Serums	Agglutination
0	O agglutination to 1-500
23	O agglutination exceeding 1-100

##### *Serums from Vaccinated Individuals*

Per cent of Serums	Agglutination
91	H agglutination 1-40 or over
81	O agglutination 1-40 or over
26	O agglutination exceeding 1-100
0	O agglutination to 1-500

The relationship of O agglutination to infection seems definite, but the titers of 1:100 and 1:200 as suggested by Felix are not sufficiently high to be specific since the 1:100 titer was exceeded by

23 per cent in the non-typhoid group and in 26 per cent of vaccinated subjects.

It will be seen that 87.5 per cent of the typhoid patients agglutinated the O antigen in serum dilutions of 1-500 and such a dilution might arbitrarily be accepted as indicative of infection regardless of vaccine history.

The ease of preparation of antigens and their stability recommends H and O agglutination as a laboratory procedure in the diagnosis of typhoid fever, although it could never have the validity of the isolation of the causative organism.

### CONCLUSIONS

1. Both H and O agglutinins are produced in typhoid fever.
2. O agglutination in high titers (1-500 or greater) is very suggestive of typhoid infection.
3. Lower titers do not rule out O agglutination due to related infections or vaccination.

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## Care of the Feet

ALL workers in factories where there is a medical department should be given an opportunity to examine a skeleton of the foot which at the same time should be explained to them. This would prevent much misuse of the foot, improper shoes, etc. In particular, fatigue reduction would follow.

A discussion is presented on the general principles of standing, production of falling arches, varicose veins, the proper gait, the value of the foot bath, and description of so-called corrective exercises which can be carried out at nights.—May R. Mayers, *Indust. Bull.*, New York Dept. of Labor, Albany, 11, 7:226, 237 (Apr.), 1932.  
E. R. H.

# Significance of Infant Mortality Data in Appraisal of an Urban Community\*

A. D. H. KAPLAN, PH.D.

*Denver, Colo.*

THE records of 1915 put the infant mortality rate of the United States registration area at 99.9 per 1,000 live births. For that year Denver made respectable comparison, with an infant death rate of 91.3.

Since that time Denver has furnished impressive examples of civic consciousness and growth. It has expanded its hospital and sanitary facilities; converted its public dumping grounds into parks and boulevards; completed a Civic Center widely celebrated; and erected palatial school buildings to excite the admiration of visiting school administrators.

Nevertheless, from 1915 to 1928 the registration area of the United States as a whole had been achieving consistent improvement in its infant mortality rate until the figure had been brought down below 70 per 1,000. The death rate of the 25 largest cities of the country now stood at 66.5; Seattle and Portland led the march of progress with a rate of 43. At the bottom of the list was Denver; her infant death rate in 1928 was still at 91, where it had been in 1915.

The infant mortality study in Denver may be construed as an effort to solve the paradox of a city noted for its beauty, cleanliness, and civic pride, suffering an infant death rate higher than that of any other American city of its class.

Those responsible for the investigation recognized that there would be little justification for the undertaking if it were just another tabulation of general causes of infant mortality. What was required was an analysis of the community, as comprehensive as practicable, which might help to uncover those factors in Denver's infant mortality problem that were amenable to preventive measures or improvement. The composition of the population, the housing conditions, and the sanitary facilities of each district were to be studied for their bearing on infant mortality. A questionnaire, evolved after consultation with physicians, nurses, and health officers, and a month's trial in the

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\* Read at the Third Annual Meeting of the Western Branch American Public Health Association, at Denver, Colo., June 9, 1932

field, reflects the effort to obtain an adequate basis for significant conclusions.

The study embraces every live birth and stillbirth in the city of Denver during the 12 months ending February 28, 1931, and each infant death within that group of live births. The total of the live births was 5,330; of stillbirths 180, of infant deaths 410, of maternal deaths 41. The stillbirth rate was 33.8 per 1,000 live births. The mortality rate on the live births was 77 per 1,000 live births.

Of the deliveries in Denver during the 12 months 895 were non-Denver cases, 16.8 per cent of the total. Deaths may have occurred within this out-of-town group during the infancy year; some of these, of course, would not be tracked down by our study. We are reasonably certain that we have all deaths which occurred among the out-of-town cases within 2 weeks after birth—33. The Denver resident deaths during the first 2 weeks were 179, against a total of 350 infant deaths for the year. Assuming, between the 2-week and the annual figures, the same proportion among the out-of-town cases as we have for the resident group, we estimate the number of infant deaths for the out-of-town group during the year to be 65, giving them a mortality rate of 73 per 1,000. Before the year was over we actually obtained information on 55 deaths from this group, leaving us 10 short of our estimated quota. The resident cases showed an infant death rate of 80 per 1,000.

Denver's apparent infant mortality rate, for births within the period of our study, is 87; the higher "official" figure is due to the intake by the Health Department of 55 death certificates of babies that died in Denver but were not born there.\* This intake is an excess of 45 over the number of additional deaths that our estimate would require against the out-of-town cases that were delivered in Denver, and would hardly be considered within the purview of any general efforts to reduce Denver's infant mortality.

The interrelations developed among 5,500 questionnaires, each containing 150 items of medical and social data, are evidently beyond the scope of a 30-minute discussion. This paper has been confined, therefore, to some data on the distribution of significant general factors among the districts and distinctive groups of the city. The objective is to illustrate how the infant mortality problem reflects the social and economic conditions of the community.

In Figure I we see the 33 districts into which the city is divided for social service purposes. The black areas represent the districts

\* The number of death certificates received by the Health Department on cases not delivered in Denver, 55, happens to be the same as the number of Denver death certificates on the out-of-town cases delivered in Denver and included in the study. But the two items are distinct.

in which the infant mortality rate was 100 per 1,000 or over. The dark cross-hatched areas show the districts with infant mortality rates ranging from 75 to 100; the light cross-hatched lines are used for the districts with rates from 50 to 75, while the lightly stippled areas are the banner districts, having less than 50 infant deaths per 1,000 live births. The map is based on the data in Table I, giving the distribution of infant mortality by districts.

It will be seen that wide differences exist in the infant mortality of Denver's various districts, ranging from 24 per 1,000 in District A to 210 in District K; 21 districts show a mortality above the average. A composite of the 5 best districts gives them 18 deaths out of 566 live births, or a rate of 32 per 1,000. The 5 most unfavorable districts give 101 deaths out of 532 live births, a rate of 190 per 1,000. The black districts form a continuous area in the "bottoms" along the Platte River. Paralleling this area are the railroad yards; overhead are viaducts which carry traffic between the east and west sides of Denver. It is this part of the city in which incomes are lowest, poor shacks predominate, sewers are lacking, toilet facilities are

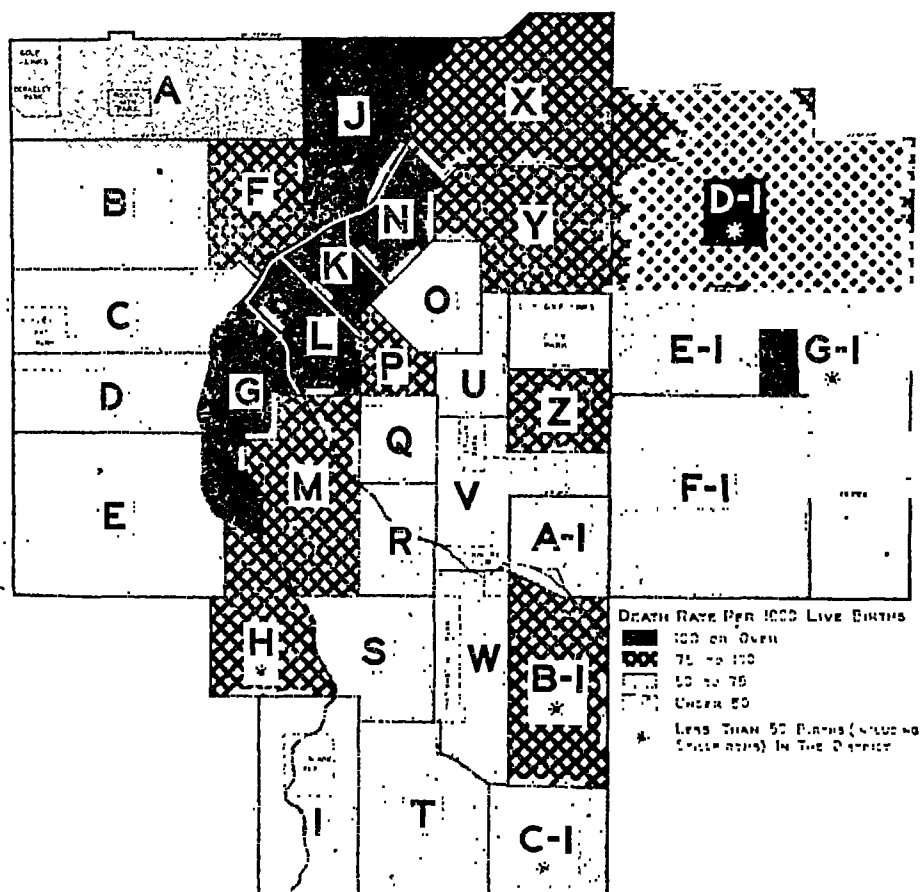


FIGURE I—INFANT DEATH RATE BY DISTRICTS

TABLE I  
DEATH RATES BY DISTRICTS

District	Infant deaths			District	Infant deaths		
	No. of live births	Number	Rate per 1,000 live births		No. of live births	Number	Rate per 1,000 live births
A	167	4	24	V	134	6	45
B	291	18	62	W	104	4	38
C	109	8	73	X	86	7	81
D	154	9	58	Y	209	16	77
E	188	11	59	Z	119	11	92
F	238	18	76	A-1	50	2	40
G	172	35	203	B-1	36	3	83
H	35	3	86	C-1	33	2	61
I	51	3	59	D-1	24	2	83
J	123	13	106	E-1	103	3	29
K	100	21	210	F-1	49	3	61
L	72	13	181	G-1	39	5	128
M	403	31	77				
N	149	27	181	Total	4,371	350	80
O	208	15	72				
P	150	13	87	Denver unclassified	25	3	120
Q	142	5	35	Out-of-town cases	895	55	61
R	130	9	69	Not reported	39	2	51
S	172	12	70	Total	959	60	63
T	219	13	59				
U	112	5	45	Grand Total	5,330	410	77

primitive, and the highest percentage of unemployment exists. It is an area largely unknown to the residents "on the hill," who have comfortably held to the assumption that Denver is a city without slums.

#### HOUSING

In a study made for the Denver Real Estate Exchange in 1930\* data were obtained concerning the number of those living units in the city appraised by the municipality at less than \$200. Figure II indicates the location of these shacks throughout the city. The shacks—those constructed prior to 1901—are shown by solid black dots, each dot representing ten such units. The circles represent homes appraised at less than \$200 which are of more recent construction and in a better state of repair.

Again we find our submerged district along the Platte River, with a predominance of old shacks in the region that showed the highest death rate. The greatest concentration of old shacks is found in District G—224 in number. A tour of the district reveals several

\* See *Real Estate Inventory and Market Survey of the City and County of Denver, Colorado, as of September, 1930* published by the University of Denver Bureau of Business and Social Research for the Denver Real Estate Exchange.

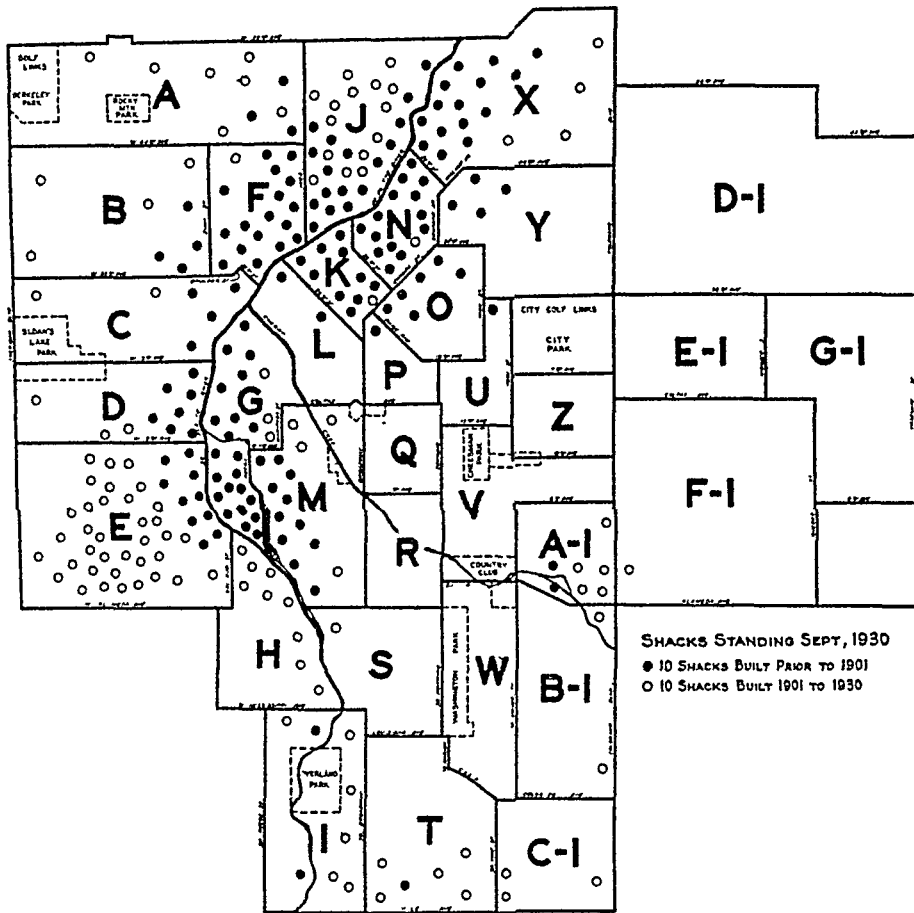


FIGURE II—LOCATION OF SHACK-HOUSING, SEPTEMBER, 1930

hundred shacks of somewhat more recent origin which are hardly more fit for habitation than are the older 1-room dwellings. Indeed it has been found that 86.2 per cent of all the homes in District G, 90.8 per cent of those in District N, and 89.1 per cent of those in District K were built prior to 1901.

The division of the homes of nominal appraisal into those of newer and older construction, respectively, sheds some light on the apparent paradox that District E, adjoining the Platte River on the northeast, had a death rate of only 59 per 1,000. In general, the houses of low appraisal in this district are away from the river bottoms; they represent modest homes built on large plots of ground, frequently constructed by the residents themselves. It is a district of permanent residents who have purchased their inexpensive lots, in contrast to the shifting population of the congested shacks in the 5 districts along the "bottoms."

The 5 districts which showed the lowest infant death rate contain 182 out of 2,713 shacks for the city as a whole, 6.7 per cent of the total.



## ANNUAL RATE VERSUS EARLY INFANCY RATE

The 1930 infant mortality data for the country as a whole have not yet been released; but if we compare the 1929 United States infant mortality rate of 67.6 with the Denver rate of 77 per 1,000, and then compare the corresponding 24-hour death rate of the nation, which was 15.3, with Denver's, 26 per 1,000, we realize that the city of Denver has an unduly large percentage of deaths under 1 day, as compared with its annual rate. Where the United States rate for the first 24 hours was 22.6 per cent of the total mortality for the year, Denver's 24-hour rate was 31.3 per cent of its annual infant death rate. This suggests the desirability of a careful medical analysis of local practice in deliveries.\*

There is a striking contrast between the relative importance of the early infancy mortality in the poor sections, and that of the better districts of the city. If we consider the 5 districts along the Platte River, which account for the greatest number of infant deaths, we find that only 21 of their 109 occurred during the first 24 hours. Their 24-hour death rate was less than one-fifth of their yearly rate. When we take the 5 most favorable districts of the city, with a total of 23 deaths, we have 12 of them within the first 24 hours: *i.e.*, more than one-half of the infant mortality in these 5 best districts occurred during the first 24 hours. The favorable districts suffered slight loss among the babies that lived past the first 24 hours; the poor districts had the preponderance of their losses as the year advanced.

## RACIAL FACTORS

The bulk of Denver's negro population is in District O, which accounted for 65 of the 91 negro live births in the entire city. Here a noteworthy record has been made, with only 1 negro infant death among the 65 deliveries, a rate of 15 per 1,000. The infant mortality rate for all of Denver's negro births was 63 per 1,000. By way of accounting for the few deaths among the colored cases in District O, two suggestions occur: an infant welfare station of the Visiting Nurse Association is located in the negro section, open to all women in the district; there were 138 white births in District O, as against 65 negro births, but the records of the welfare station indicate that 80 per cent of the expectant mothers availing themselves of the facilities for prenatal care were negroes. They enjoy, for the most part, favorable housing conditions, occupying homes in a section that used to be tenanted by the upper middle class of the white population, before the whites gave way to the influx of negroes into the district.

\* The obstetrical data on this phase of our study have not yet been fully broken down; they are now in process of analysis.

The antithesis of the negro situation is furnished by the high infant mortality record of the Spanish-speaking, usually referred to as the Mexican, population. The aggregate of Mexican births for the 12-month period was 294, of which 277 were assignable to definite districts. Of this group there were 185, about two-thirds of the total Mexican births, in districts F, G, K, and N. In this area the composite Mexican infant mortality rate was 232, nearly treble the rate of 81.7 for the non-Mexican population. For all Mexican live births in the city the infant death rate was 206. The Mexican stillbirths were likewise out of line, with 61 per 1,000 live births. Though the Mexicans constitute approximately 3 per cent of the Denver population, they furnished 6 per cent of the city's total births, and they accounted for 14 per cent of the infant deaths. It is obvious, therefore, that in any effective campaign to reduce Denver's infant death rate, particular attention will have to be given to the Mexican sections.

#### FAMILY INCOME

That there is a progressive concentration of infant mortality in the poorer districts as the year advances, seems to be borne out in the consideration of infant deaths by income levels. If we separate the 2-week record from the data for the balance of the year, at the various income levels, we have the picture shown in Table II.

Clearly the trend is a closing-in of the gap between the 2 weeks' mortality and the yearly mortality, as we go from the lower to the higher income levels. In the lowest income group, the loss after the second week is more than twice that of the first fortnight. In the highest income class, the additional deaths after the first 2 weeks represent only 11.1 per cent of the yearly mortality.

The income data appear to confirm, on the whole, the familiar tendency for infant mortality to increase with the decline in income levels. This is especially true as we approach the lowest levels of self-support. For that section of Denver's population having family incomes under \$500, the infant mortality rate is 186 per 1,000 live births. (This high rate is obtained despite the fact that the class in question includes the charitable cases, in the group under \$250, which with the aid of public medical care and public relief manages to hold its infant mortality rate at 72.) For the income class of \$3,000 and over, the infant death rate is only 25 per 1,000 (see Table III).

In the breakdown of income levels by districts, we come upon a low income area which comprises the same districts that stood out in Figure I as having the highest infant death rate in the city. Every

TABLE II

<i>Income</i>	<i>Number of infant deaths</i>	<i>Infant death rate per 1,000 live births</i>	<i>Income</i>	<i>Number of infant deaths</i>	<i>Infant death rate per 1,000 live births</i>
Under \$500			\$2,000 and under \$2,500		
Under 2 weeks	14	51	Under 2 weeks	11	27
2 weeks to 1 year	34	125	2 weeks to 1 year	7	17
Total	48	176	Total	18	44
\$500 and under \$1,000			\$2,500 and under \$3,000		
Under 2 weeks	31	37	Under 2 weeks	8	33
2 weeks to 1 year	49	59	2 weeks to 1 year	4	16
Total	80	96	Total	12	49
\$1,000 and under \$1,500			\$3,000 and above		
Under 2 weeks	47	43	Under 2 weeks	8	22
2 weeks to 1 year	31	28	2 weeks to 1 year	1	3
Total	78	71	Total	9	25
\$1,500 and under \$2,000			All income groups (in- cluding Not Reported)		
Under 2 weeks	22	28	Under 2 weeks	216	41
2 weeks to 1 year	23	29	2 weeks to 1 year	188	35
Total	45	57	Total	404	76

district with a death rate of 50 or less is in the income level above \$1,500. From there on such factors as the *para*\* of the child, age of the mother, etc., have been found to modify the relationship between income and infant mortality.

#### BIRTH RATES

Our data on incomes and birth rates do not correlate consistently with infant mortality in all districts. An accurate census of the population by districts is not available, but we know the number of living units in each district as of 1930,† and may therefore offer some rough comparisons on that basis. The 3 districts of highest infant mortality were Districts G 203, K 210, and N 181. These in turn

\* By the term *para* the offspring of a given mother are distinguished. Para No. 1, for example, is the first "life" created in the mother's womb; para No. 2 is the second, and so on. For this purpose, abortions, stillbirths, and live births are counted. In the case of multiple births, a number is given to each of the offspring in the order of its birth. In other studies of infant mortality, notably the recent British study "On the Relative Value of the Factors which Influence Infant Welfare" (University of London, Eugenics Laboratory Memoirs. XXV), the numerical order of the infant is referred to as *place in the family*. That expression, however, has social implications which might exclude the illegitimate births, or the offspring of a previous marriage that have no place in the present family. It has seemed more feasible, as well as convenient, to express the desired meaning, in the present manuscript and tables, by using simply the term *para*.

† University of Denver Bureau of Business and Social Research, *op. cit.*

TABLE III  
INFANT MORTALITY AND AVERAGE PARA BY INCOME GROUPS

<i>Annual family income</i>	<i>Number of Live births</i>	<i>Deaths</i>	<i>Death rate per 1,000 live births</i>	<i>Average para</i>
Under \$250 *	56	4	72	4.12
\$ 250 to \$ 500	218	44	202	3.71
500 to 750	398	40	101	3.18
750 to 1,000	440	40	91	2.96
1,000 to 1,250	767	58	76	2.70
1,250 to 1,500	337	20	59	2.60
1,500 to 2,000	790	45	57	2.42
2,000 to 2,500	408	18	44	2.22
2,500 to 3,000	247	12	49	2.36
3,000 or more	363	9	25	2.39
Not reported	1,306	120	92	2.04 †
All incomes	5,330	410	77	2.54

\* Charity cases included.

† Based upon 1,173 cases only, since para information was lacking on 133 cases in this group.

show the highest number of births relative to living units, as follows: District G—172 births in 1,336 living units, District K—100 in 877, and District N—149 in 1,575. Combining these 3 districts we get 111 births per 1,000 living units, by far the highest birth rates for any 3 districts in the city. These are at the same time the ones which rank lowest in average income.

Against these we have a contrast in the 3 residence districts of lowest birth rates, namely, Districts Q, U, and E-1, with a composite birth rate of 37 per 1,000 living units. Their infant mortality rates are third, sixth, and second, respectively, from the lowest. In income they rank third, fourth, and second, respectively.\*

An unmistakable tendency in our data is for the higher income classes to show low birth rates and *vice versa*. This will be evident from a glance at Table III, which gives the average *para* of the births at each income level. When we break down the infant mortality record by the *para* of the child we find little difference in infant mortality rates for paras 1 to 5. But a sharp rise in the death rate occurs from *para* 5 on. The average death rate for paras 1 to 4 inclusive, is 67 per 1,000 live births, while for paras 5 and over we have an infant mortality record of 143 per 1,000 live births. The infant mortality rate for each *para* is shown below. As to the general relation of

\* It does not follow, however, that we have no examples of large families and moderate incomes going hand in hand with low mortality. The most striking case in point is that of District A, with a birth rate of 64 per 1,000 living units and a median income level only a little above \$1,500, leading the districts with an infant mortality of only 24. It is a district free from congestion, containing two of the city's largest parks, and detached homes of established residents at an almost uniformly middle-class level. On the other hand, we have District Z quite out of line in the other direction, with 11 deaths in 119 live births for an infant death rate of 92, although its birth rate is only 43, and its district income is fifth from the highest.

infant death rates to birth rates and income, a permissible conclusion is that high para and low income, when found together, mean a high infant mortality.

TABLE IV  
INFANT MORTALITY IN DENVER CLASSIFIED BY PARA  
(Denver residents only)

<i>Para</i>	<i>Live births</i>	<i>Deaths</i>	<i>Infant mortality rate</i>
1	1,623	104	64
2	1,047	69	66
3	640	46	72
4	363	26	72
5	249	28	112
6	148	24	162
7	101	14	139
8	54	8	148
9	50	11	220
10 or more	71	11	155
Not reported	25	9	360
Total or average	4,371	350	80

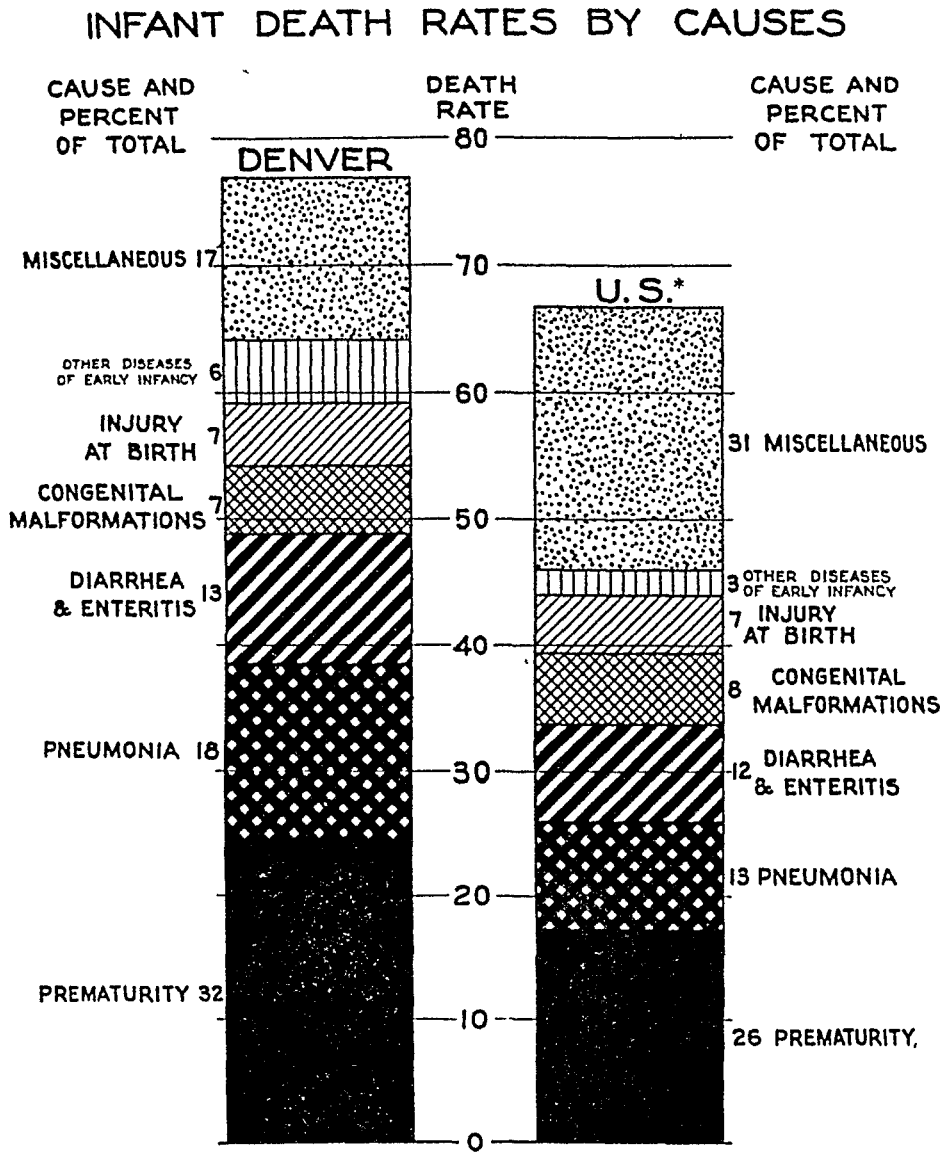
#### CAUSES OF DEATH

The ranking of the leading causes of death is the same for Denver's cases as it is for the United States, as may be seen in Figure III. Three items, however, command attention. The first is the relatively high incidence of prematurity in Denver, constituting 32.2 per cent of the infant deaths. The prematurity death rate for Denver is 24.6 per 1,000 live births, against 17.4 (1927-1928 average) for the country as a whole.\* The second feature to command our interest is the record on pneumonia and other respiratory diseases. Denver's infant deaths from pneumonia account for 18 per cent of the total infant mortality, while for the United States the incidence of pneumonia is 13 per cent. Expressed as rates, Denver's infant mortality from pneumonia is 14 per 1,000 live births, while for the country at large it has been 8.9 (1927-1928 average). In connection

\* In discussing this paper at the western meeting of the A.P.H.A. Dr. John W. Ames made pointed reference to the prevalence of prematurity on Denver death certificates, as follows: "The term 'prematurity' often appears as the last resort of the careless, untrained accoucheur, hurried (or harried) into a diagnosis by some distracted parent or insistent funeral director. As a matter of fact we may well doubt the accuracy of such a decision in many of these cases; it is entirely conceivable that many of these deaths are due to birth injury, such as intracranial, pulmonary or gastrointestinal hemorrhage which a few moments of intelligent investigation would reveal. Even with post-mortem examination refused (as it usually is) lumbar, ventricular, or cisterna puncture will often clear the situation immediately. The fact, developed by Dr. Earp and me in conference with physicians on this matter, that practically all diagnoses of prematurity have been made by poorly trained obstetricians not attached to our teaching hospitals is illuminating. In any event, in spite of the obvious weakness in our Nomenclature of Disease, if the term prematurity or immaturity is used, it should, on occasion, be qualified. One could say, for example, 'death from prematurity, by reason of multiple pregnancy, from nephritis, heart disease, exophthalmic goiter, diabetes, pneumonia, tuberculosis, etc.,' in the mother. If in doubt, he can always turn the case over to the coroner's physician.

"It is obvious that with nearly 50 per cent increase in mortality during these early weeks of life we cannot hope in Denver to bring our ratio to any fair approximation with those of comparable cities in the United States."

FIGURE III



with the records on diarrhea and enteritis the relative importance of these factors for Denver generally is seen to be in line with that of the nation.

Among the Spanish speaking population of the city diarrhea and enteritis rank as a first cause of infant mortality, with 34 per cent of all the Mexican infant deaths due to this cause. The pneumonia mortality likewise falls most heavily on the Mexican group, accounting for 33 per cent of all the infant deaths. In other words, these two causes combined account for two-thirds of all the Mexican mortality in Denver. In view of the fact that this group occupies the poorest housing section of the city there seems to be room for a pointed inference in the case of the Mexicans regarding the relation between poor housing and sanitary conditions and high infant mor-

tality. An unexpected finding of the study is the infrequency of tuberculosis as a cause of infant mortality, with 1 case in 410 deaths. The United States census for 1928 showed 1,227 infant deaths due to tuberculosis, equivalent to 8 of every 1,000. The fact that tuberculosis as a cause of infant deaths thus ranked lower for Denver than for the United States registration area as a whole, is contrary to the commonly held assumption that tuberculosis would have an important bearing on infant mortality in Denver.

#### PRENATAL CARE

From a statistical standpoint, some of the most satisfactory data in the study have been found in the correlation of prenatal visits and infant mortality. Taking the whole sample, we get a record of infant deaths by prenatal visits shown in Table V.

TABLE V  
INFANT MORTALITY IN DENVER CLASSIFIED BY PRENATAL VISITS

<i>No. of prenatal visits</i>	<i>Live births</i>	<i>No. of deaths</i>	<i>Infant mortality rate</i>
None	375	74	198
1 or 2	846	109	129
3 or 4	692	73	105
5 or 6	678	49	72
7 or 8	758	33	44
9 or more	1,162	35	30

Table VI shows the percentage distribution of prenatal visits among the stillbirths, the live birth deaths, and the live births exclusive of deaths.

TABLE VI  
PERCENTAGE DISTRIBUTION OF PRENATAL VISITS

<i>No. of visits</i>	<i>Live births exclusive of deaths</i>		<i>Live birth deaths</i>		<i>Stillbirths</i>	
	<i>Number</i>	<i>Percentage</i>	<i>Number</i>	<i>Percentage</i>	<i>Number</i>	<i>Percentage</i>
None	299	6.1	74	18.0	24	13.5
1 or 2	737	15.0	109	26.6	36	20.2
3 or 4	619	12.6	73	17.8	32	18.0
5 or 6	629	12.8	49	12.0	20	11.2
7 or 8	725	14.7	32	7.8	28	15.7
9 or more	1,127	22.9	35	8.5	24	13.5
Not reported	784	15.9	38	9.3	14	7.9
Total	4,920	100.0	410	100.0	178	100.0

As might be expected the small number of prenatal visits is found to predominate among the stillbirths and live birth deaths, while most of the infants who lived through their first year were born to mothers who had had the benefit of 5 or more prenatal visits.

While a large number of the cases undoubtedly must be listed with the unavoidable hazards of life and death, it is believed that

Denver's high infant mortality can be made to yield substantially to corrective efforts. At this stage it is already clear that the city requires relief from the archaic housing conditions that obtain in the "Shacktown" area along the Platte River. The mayor and the manager of public health have already made use of the charts prepared under the study, for the elimination of 318 of the least inhabitable old shacks. The city auditor has advised the writer that in the condemnation of these undesirable houses not a single suit has had to be defended in the courts. The Denver Real Estate Exchange has coöperated to the extent of obtaining the lowest possible rents for the displaced families in housing of a better grade. The city has also coöperated with the Citizens' Unemployment Committee by providing emergency employment repairing dilapidated open ash pits, tearing down insanitary out-houses and clearing backyards, in a general effort to raise the housing level among those who do not appear to be able to help themselves.

These preliminary steps, taken shortly after the housing data were released to the city health authorities will, it is hoped, pave the way to a more comprehensive program in respect to other aspects of the study. A few examples suggest themselves: The Mexican population, whose settlement in Denver is a response to the needs of the beet sugar industry, offers a special problem in the adjustment of a simple, rural folk to urban conditions. The loose employment of "Prematurity" as a convenient diagnosis in early deaths, coupled with the relatively high proportion of deaths under 1 day in Denver, suggests the need of a closer follow-up of the causes of mortality in early infancy. If early prenatal care is a matter of general concern, the problem of saving apparently well-born infants looms as a neglected factor especially applicable to the submerged classes of the population.

Among those who have actively participated in this study, the feeling prevails that an analysis of the infant mortality of a community offers significant clues to its more general social and economic problems.

NOTE: The writer wishes to acknowledge that the collaboration of Professor F. L. Carmichael, director of the Statistical Laboratory in the Bureau of Business and Social Research, University of Denver, is reflected in the statistical material supporting this paper. Research Fellows of the Bureau, who have coöperated in the tabulation of the data, include Jesse R. Wood, Jr., Raymond Nassimbene, Alice B. Lester, and Helene Sipprelle. The field investigations were made by the staff of the Denver Visiting Nurses Association, and supervised by Dorothy Watkins Conrad, R.N.



# Effect of Hyperpyrexia Induced by an Ultra-high Frequency Current on *B. typhosus* Agglutinin and Complement

E. E. ECKER AND M. O'NEAL

*The Institute of Pathology, Western Reserve University, Cleveland, O.*

THERE appeared in the literature as early as 1915 a controversy as to whether high fevers depress or destroy the agglutinins to *B. typhosus* in vaccinated individuals. Tidy<sup>1</sup> observed that febrile conditions apparently remove the agglutinins to *B. typhosus* from the blood after inoculation. Dreyer,<sup>2</sup> however, disagreed with this view. After further observations Tidy<sup>3</sup> again stated that in his opinion marked hyperpyrexia of whatever cause, in inoculated individuals, tends to destroy the agglutinins. Dreyer<sup>4</sup> then showed that in a series of 108 cases inoculated within a year, various febrile diseases failed to change the agglutination titer materially. Tidy<sup>5</sup> pointed out that Dreyer had no controls for his series and was, therefore, not justified in his conclusions. Up to the present, so far as we know, no further work has been contributed to clear up the controversy.

An opportunity presented itself to produce hyperpyrexia in experimental animals by means of placing them in the electromagnetic field created by a high frequency vacuum tube oscillator. By means of the hyperpyrexias thus induced, it was possible to study further the effects of high fevers on agglutinins and complement.

Although Schereschewsky<sup>6</sup> had thought the band of frequency of such a current between 20,000,000 and 80,000,000 cycles per second exerts a specific lethal effect on living tissue cells, it has been shown by Knudson and Schaible,<sup>7</sup> Jacobson and Hosoi,<sup>8</sup> Bischoff, Ullmann, Hill and Long,<sup>9</sup> and Mortimer<sup>10</sup> that the physiological and morphological changes produced by exposure to an ultra-high frequency current are no different from those produced by hyperpyrexia induced by any other method. Christie and Loomis<sup>11</sup> have shown that the effects produced on animals can be fully explained on the basis of the heat generated by the induced high frequency current. They could find no evidence to support the theory that certain wave lengths have a specific action on living cells.

TABLE I  
AGGLUTININS (TYPE EXAMPLE RABBIT 1958)

Animal	Date 1932	Time Heated Hrs.	Temperature Degrees C.	Hb. Per cent	R. B. C.	Agglutinin Titers
Rabbit 1958	4- 1		38.6	65	4,460,000	1:320
" "	4- 1	3	41.9	63	4,310,000	1:160
" "	4- 2		38.4	61	3,800,000	1:160
" "	4-25		38.5	67	5,150,000	1:80
" "	4-25	2½	41.2	72	5,220,000	1:40
" "	4-26		38.1	68	3,120,000	1:40
" "	5- 4		38.0			1:80
" "	5- 9		37.5	72	5,300,000	1:80
" "	5- 9	2	42.1	65	5,350,000	1:40
" "	5-10		37.4	68	4,825,000	0

The physiological effects of the alternating current can be profoundly changed by variations in frequency (D'Arsonval<sup>12</sup>). As the frequency of alternation is increased, a point is reached where stimulation no longer occurs, and the subject feels only a sensation of warmth and prickling of the skin. As the frequency is still further increased, the prickling sensation disappears until at  $10^6$  cycles per second, heat production is the only effect which can be demonstrated. At frequencies below 50,000,000 cycles per second the effect of these radiations on animals is proportional to the intensity of the electromagnetic field.<sup>11</sup> Using this type of machine, then, we can test the effect of hyperpyrexia without fear of any complicating side effects.

#### METHOD OF EXPERIMENT

A high frequency vacuum tube oscillator, manufactured by the General Electric Co. was used to induce the fever. The animals were placed in a well ventilated wooden box in the electromagnetic field created by two metal electrodes between which the current alternated at  $10^7$  cycles per second. The temperature of the animals was recorded by a rectal thermometer, care being taken to insert the bulb well into the rectum in order to get true readings. The temperature was controlled by regulating the distance between the electrodes.

Five rabbits were tested for the thermal effect on agglutinins to *B. typhosus*. One month before the hyperpyrexia was produced these animals were prepared by subcutaneous inoculations, (4) at 5-day intervals, of 0.5 and 1.0 c.c. of killed typhoid vaccine containing 1,500,000,000 organisms per c.c. Routine agglutinations were done before and after heating, using the Kinyoun strain of *B. typhosus*.

The serum of 3 rabbits in 1:2 dilution, and 9 guinea pigs in 1:30 dilution were titrated before and after heating for complement.

In each animal, also, red blood cell counts and hemoglobin determinations (Sahli method) were made both before and after heating, in order to determine the effect of radiation on blood volume.

#### RESULTS OF EXPERIMENT

Five rabbits were heated for lengths of time varying from 30 minutes to 4½ hours. The temperature obtained was 40.2° to 43° C., a change of 2.1°–4.9° C. from the normal. In each case, after heating, the agglutination titer was lowered, greater depression being observed after the longer periods of heating. The titer of the agglutinins had returned to normal within 24 hours to 1 week in every case except 1, in which the titer kept decreasing in spite of the administration of an additional 1 c.c. of vaccine. In 1 instance, in which the temperature had reached 43° C., the animal did not survive and the terminal agglutination titer rose to 1:1,280, whereas the original titer had been 1:320. The blood volume was concentrated little or not at all by the extreme hyperpyrexias, as shown by the hemoglobin and total red cells, the latter being very slightly changed except in the fatal case in which both were markedly increased.

Nine guinea pigs were heated from 30 minutes to 3½ hours. Temperatures of 40.0° to 42.8° C. were obtained representing a rise of 2.8° to 6.2° C. from the normal. In each case the complement was depressed during the first heating. In 2 cases the complement decreased as the temperature returned to normal, only to be again depressed by a second heating. In 3 cases the complement was restimulated by subsequent heatings. As in the other animals, it was found that there was little or no change in the blood volume except in the fatal case in which it was decreased as shown by the increased hemoglobin and total red cells.

Three rabbits (Table II) were heated from 1½ to 2 hours. The temperatures reached were 40.1° to 43.1° C. a rise of 1.6° to 3.9° C. from the normal. Complement was decreased during the hyperpyrexia in all but 1 case (1958) in which it was stimulated. In 2 cases,

TABLE II  
COMPLEMENT (TYPE EXAMPLE GUINEA PIG I)

Animal	Date 1932	Time Heated Hrs.	Temperature Degrees C.	Hb. Per cent	R. B. C.	Complement 1:30 Complete Hemolysis in
Guinea pig 1	3- 2		35.3	85	4,510,000	1:145
" " "	3- 2	2	41.0	75	4,500,000	1:125
" " "	3- 3		36.8	75	3,840,000	1:125
" " "	3-29		36.0	85	5,600,000	1:100
" " "	3-29	3½	40.5	75	4,840,000	1:125
" " "	3-30			68	3,500,000	1:100

(TYPE EXAMPLE RABBIT 1958)

Complement 1:2

Rabbit 1958	Date	Time Heated Hrs.	Temperature Degrees C.	Hb. Per cent	R. B. C.	Complement 1:2
Rabbit 1958	4-25		38.5	67	5,150,000	1:110
" "	4-25	2½	40.0	72	5,220,000	1:200
" "	4-26		38.1	68	3,120,000	1:250
" "	5- 4		37.5			1:100
" "	5- 9		37.5	72	5,300,000	1:200
" "	5- 9	2	42.1	65	5,350,000	1:100
" "	5-10		37.4	68	4,825,000	1:100

in which complement was depressed during the fever, it rose as the temperature returned to normal. Blood volume was very slightly changed as evidenced by hemoglobin and total red cell counts.

These results are important in the routine diagnosis of typhoid fever when often, during the hyperpyrexia, blood is withdrawn for a Widal test and a low titer (1:60) found. Such cases have come to our notice and stimulated this work.

## SUMMARY

1. Hyperpyrexia was induced in 9 guinea pigs and 10 rabbits by means of a high frequency electric current. Temperatures of  $40.5^{\circ}$ – $43.1^{\circ}$  C. were obtained. Temperatures of  $42^{\circ}$  C. or over, if maintained for any length of time, were lethal.

2. The hyperpyrexia so induced depressed, but did not entirely destroy, inoculation agglutinins to *B. typhosus*. The amount of depression was roughly proportional to the length of time of heating and the degree of temperature obtained.

3. The inoculation agglutinins returned to their original titer within 24 hours to 1 week, except in 1 fatal case in which there was a terminal stimulation beyond the original titer.

4. Complement was usually depressed on first heating, but on a second was stimulated. In no case was it completely or permanently destroyed.

5. Hyperpyrexia has no permanent effect on inoculation agglutinins. If they are depressed during the time of fever, they soon return to normal.

NOTE: We wish to thank Dr. C. J. Wiggers for the use of the high frequency vacuum tube oscillator and Dr. H. A. Blair for his advice on the use of the machine.

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## Safety Education

THE progress of safety education in the schools of the United States will be traced by William John Cooper, U. S. Commissioner of Education, at the Twenty-First Annual Safety Congress and Exposition, October 3 to 7 in Washington. While automobile accidents involving adults have been increasing in recent years, accidents involving children of school age have been drastically reduced, and this is largely the result of teaching habits of play and work to children in the school.—*Public Safety* (National Safety Council), 6, 9:10 (Sept.), 1932.

# Observations and Studies on Silicosis by Diatomaceous Silica<sup>\*</sup>

ROBERT T. LEGGE, M.D., and ESTHER ROSENCRANTZ, M.D.

*Department of Hygiene; and Department of Medicine;  
University of California Medical School, San Francisco, Calif.*

BECAUSE of the excessive morbidity and high mortality from silicosis and tuberculosis, the South African Government created, in 1926 at Johannesburg, the Miners' Phthisis Medical Bureau. It is due to the researches of this bureau that we owe our modern knowledge of silica dust diseases.

At the Rand there are employed nearly 200,000 miners—European and native. These men work in quartzite which contains from 86 to 96 per cent of silica. As there is such a wealth of material for scientific investigation it was possible for investigators to determine the causation and the pathology of the disease. Much credit is due to Drs. W. Watkins-Pitchford and Mavrogordato for their statistical studies and for the classification of the different stages of the disease. This was determined from physical examinations, chemical and roentgen-ray examinations, and autopsy findings. They demonstrated that silica of 0.5 to 5  $\mu$  gained access to the lung structure by the endothelial wandering cells, lining the air vesicles. These cells engulf the particles and carry them into the lymph channels where they become encapsulated and ultimately fibrosed in the lung structure.<sup>1</sup>

A characteristic change in simple silicosis is the production of a pigment about the silica particles that have accumulated about lymph spaces, blood vessels, and the finer bronchial structures. Ultimately many of these particles and pigments become surrounded and infiltrated with new areas of fibrosis and nodules. In tuberculosis with silicosis there is always an excess of pigment at the immediate site where the specific lesions are nodulated and have undergone fibrosis.

It has been practically demonstrated by all investigators that silica is the only dangerous dust that causes definite pathology in the lung tissues with the exception of bacteria, and that pulmonary silicosis is probably caused by the colloidal action of hydrated silica

<sup>\*</sup> Read at the Third Annual Meeting of the Western Branch American Public Health Association at Denver, Colo., June 11, 1932.

formed from the minute particles of dust disseminated through the lobes of the lung. With the etiology and pathology understood, investigations were carried on to determine the various stages and progress of the symptoms of the disease and the interpretation of the roentgen-ray examinations during these stages. At the same time this brought about careful medical supervision and methods of controlling dust hazards as preventive measures.<sup>2</sup>

There is evidence to show that the activity of colloidal silica in the lungs may be prevented by protecting the silica dust with a substance known to coagulate colloidal silica.<sup>3</sup> This explains why the morbidity and mortality are lessened and the length of time increased before the "effective period" occurs, as has been shown in certain abrasive industries where clay is present with the silica and in coal mines where shale is present.

These important observations should receive careful consideration by mine operators. They should determine the physical and chemical structure of the material mined or quarried and a careful analysis should be made of the percentage of silica and other contents that make up the substance. One may theoretically be able to determine the length of time it requires the different stages of silicosis and tuberculosis to ensue by the amount of silica present and to draw conclusions when the inert substances that have a coagulating effect on the particles of silica in the pulmonary structures are absent or present in smaller percentages.

Experimentally it may prove beneficial to introduce in quartz mines inert clays to obviate the silica hazards even after such preventive measures as mechanically driven ventilating exhausts, dust traps, and wet processes of drilling have been installed.

Furthermore, the careful studies of investigators in this country and Great Britain since the pioneer researches at the Rand enriched the literature by statistics, methods of diagnosis, technic and interpretation of roentgen-ray examinations; they have also brought about legal classifications for compensation and methods for prevention. Clinical experiences, mortality statistics, and post-mortem examinations are convincing proofs that silica is dangerous, as it produces a lung pathology that is a favorable site for the ravages of the tubercle bacillus. The effect of coal on miners and cement dust on the workers exposed tends to chronic bronchitis and pneumonia, and occasionally tuberculosis.

At the Rand two clinical forms of silicosis are recognized: simple silicosis and silicosis with tuberculosis. In simple silicosis, a condition arises which is associated with the presence of numerous

small inert nodules of dense fibrous tissues scattered symmetrically and uniformly throughout the parenchyma of both lungs. When these nodules are abundant and closely aggregated, upon the slightest exertion the worker experiences shortness of breath. The intensity of this symptom is in proportion to the amount of exertion. The outstanding physical signs are limited expansion, slight dullness in the upper part of the chest, harsh and high pitched inspiration, and a tendency to obesity.

Later, in the second stage, the nodules become larger, are aggregated into masses, and tuberculosis is superimposed. The clinical features are increased limitation of chest expansion, loss of weight, marked dyspnea, cough, expectoration, pleuritic pains, and much disability with cachexia. Of the advanced cases, 78 per cent were observed to be of this type and all among the native workers due to their marked susceptibility to the tubercle bacillus. The onset in all cases was simple silicosis. From silica dust contact to the recognition and appearance of silicosis is about  $10\frac{1}{4}$  years. This is known as the "Effective Period."

In the past decade many studies have been published on silicosis and other diseases caused by dusty trades. Extensive investigations were made on the lung pathology by the introduction of silica subcutaneously into the tissues and by silica inhalation. New methods of determination of air dustiness have been devised. The cardinal symptoms of the disease have been determined by all the modern methods.

Many contributions have been added to the knowledge of pneumoconiosis due to silica and many special fields have been investigated—"Miners' Consumption Among Zinc Miners in Missouri"; "Problem of Dust Phthisis in Granite Stone Industry"; "Exposure to Calcium Dust in Cement Plants"; "Dust Inhalation by Hematite Miners"; "Silicosis Among Rock Drillers, Blasters, and Excavators in New York City"; "Effects of Coal Dust on Miners"; "Dust Hazards in the Abrasive Industry," etc., etc.

In California about 350 miles south of San Francisco, in Santa Barbara County, there exists the largest and purest diatomaceous deposit probably in the world. This is in the Coast Range Mountains, at an altitude of 400 to 600 feet above sea level and 10 miles inland. A large firm is now utilizing this substance for commercial purposes. This deposit is composed of fossilized diatoms and microscopic unicellular marine algae with a silicified cell wall which when dry contains about 85 per cent silica. Due to its remarkably diversified properties it is extensively used in various important industries.



The natural substance looks like a fine deep cream colored powder. It is the greatest nonconductor of heat known and bricks made from it are used in building furnaces.

Due to its lightness, porosity, whiteness, and clarifying qualities it is also used extensively as a filtering agent. Also, due to its high silica content, it is a permanent element in concrete and does not affect the time of setting. It is also used extensively in the abrasive industries.

Being an entirely new enterprise, the operators were obliged to devise and construct special machinery for transportation, refining, and manufacturing. The machinery has not yet been perfected, although improvements in construction are constantly being evolved. Due to these imperfections and the operative methods a great deal of dust is disseminated in the atmosphere in certain working zones and constantly surrounds the habitations of the workers, as the plant operates night and day.

This material is transported from the mine by aerial trams to the cyclones and grinders in the mill, in preparation for the dryers and other machinery. The menace is due to vast clouds of dust which escape and endanger the immediate workers and are also disseminated by the prevailing winds over the district where the employees reside. At the mill the bag house is very dusty, as well as the packing quarters where the product is sacked; also where bricks are made by being sawed.

In the mine the ventilation is excellent and dust is not a factor on account of the high percentage of moisture in the product. The only places in the mine where the dust is pronounced are at the "glory hole" discharge terminals where the drag lines operate, and where the dumps are released to fill the trams.

The workers are selected Mexican laborers who have been given a physical examination by the company's physician before being employed. These people, being primarily Indian, have the highest tuberculosis mortality rate in the United States. One hundred and eight employees were given a roentgen-ray examination of their chests; the films were interpreted; and their social and medical histories taken, by the technical staff of the Bureau of Tuberculosis of the California State Board of Health. The films were rechecked by a roentgenologist at the University of California Medical School and the chest physical examinations made by the two authors, both of the University of California. The dust content estimations were made by the U. S. Bureau of Mines; the industrial hygienic survey, and recommendations were conducted by Dr. Legge.

The 108 men selected were graded as follows: employed less than 1 year; 1 to 2 years; 2 to 5 years; 5 years or more; the purpose being to determine for statistical purposes the possible time and degree required to affect the worker.

The primary motive of the study was to determine for the California Tuberculosis Association whether the hazard was definitely instrumental in increasing the county's tuberculous incidence, also to make a preliminary study as to the degree of silicosis found by physical and roentgen-ray examination.

The ages of the Mexican laborers studied ranged from 19 to 56 years. Pneumoconiosis due to silica of various degrees was found present in 81, or in 68.5 per cent of the cases. It is readily observed in Table I that the disease is a very slow growing process and advances with the years of employment.

TABLE I

	Groups					Total
	I	II	III	IV		
	Years employed:					
	0-1	1-2	2-5	5 or more		
Very early pneumoconiosis.....	0	0	8	7	15	
Early pneumoconiosis . . . . .	6	12	11	16	45	
Moderately advanced pneumoconiosis.....	0	2	4	9	15	
Advanced pneumoconiosis . . . . .	0	0	1	5	6	

It is noted that the predominating form of the disease is in the early stage, 60 men showing early pneumoconiosis, whereas 15 were in the moderately advanced stage and only 6 in the advanced stage.

TABLE II

	Years employed:				Total
	Less than 1 year	1 to 2 yrs.	2 to 5 yrs	5 yrs or more	
<i>General Appearance:</i>					
Good . . . . .	13	16	33	37	99
Fair . . . . .	2	3	2	4	11
Emaciated . . . . .		2		6	8
<i>Clubbing of Fingers:</i>					
None . . . . .	5	3	15	9	32
Slight . . . . .	9	16	18	32	75
Moderate . . . . .	1	1	1	5	8
Marked . . . . .		1	1	1	3
<i>Recommendations:</i>					
Hospital care . . . . .				1	1
Change of work . . . . .	1		2	2	5
Re-examine 3 months . . . . .	1	5	8	14	28
Re-examine 6 months . . . . .	6	6	14	19	45
Re-examine 1 year . . . . .	7	9	12	8	36
No recommendations . . . . .		1		3	4

The outstanding features revealed by the physical examination was the splendid condition of the men. We found 99, or 84.0 per

cent, in a good state; 11, or 9.3 per cent fair; and only 8, or 6.77 per cent, poor. The physical signs were strikingly few. Limited expansion and a change in the percussion note depending upon the extent of the lung involvement, were the main signs in the chest. In 86, or 72.9 per cent, of the cases there were clubbed fingers in various degrees of development, depending upon the number of years of labor in the mine. *This is the most outstanding physical sign and also the earliest to develop.* During the first year of employment two-thirds of the cases already had clubbed fingers.

The company maintains a splendid village center with hospital, recreation activities, school, etc., and were very coöperative to ameliorate any hazards that are jeopardizing the health and safety of their employees. It is hoped that another survey may be made in the near future to follow up the preliminary investigation. The following recommendations, based on the findings, were suggested:

#### RECOMMENDATIONS

1. *Employment*—No person having bronchitis, asthma, tuberculosis, or cardiac disease should be employed. The selected workmen should have a recorded history of former employment and diseases; also a complete physical examination with an X-ray film of the chest, and every year thereafter the X-ray should be repeated. This ruling should apply to the officers as well as to the laborers.

2. *Clinic*—A chest specialist should hold a clinic every 3 months at the mine, the X-ray having been taken previously by the company's doctor. By examining the workers in groups of 125, the entire plant would thus have chest examinations by the end of the year. Those needing reëxaminations or observation could report at the next clinic.

3. *Rest*—There should be 1 day's rest in 7. The present work day should be of shorter hours. Workers should alternate from dusty to non-dusty employment.

4. *Family*—The women and children of the workers should be examined once a year for the reason that the Mexican has a lower immunity to tuberculosis and it would be well to know if there is tuberculosis in the family.

5. *Medical*—The company's hospital should be in charge of a well-trained physician who is capable of making a thorough physical and X-ray examination of the chest, keeping careful records, and making sanitary and safety plant inspections regularly.

6. *Mechanical*—Suitable machinery and transportation methods should be developed in order to prevent dust dissemination in the atmosphere. Mechanical exhausts, wet processes, isolation of dusty departments, and control drafts, as well as individual respirators, should be installed and be constantly a part of the plant.

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# Adult Health Education

WALTER H. BROWN, M.D., F.A.P.H.A.

*Professor of Hygiene and Physical Education, Stanford University.  
Palo Alto, Calif.*

SHORTLY after the war, H. G. Wells made the rather startling statement that "the world must choose between education and catastrophe." These words scarcely aroused a ripple of interest. Those of us who pondered on them at all, thought he was referring to the education of children. As a matter of fact, he was talking about the adult generations. He was convinced that our stupendous blunder of identifying education with schooling and limiting that schooling to youth, could not continue if our civilization were to survive. The social, economic, and political events of the past 3 years seem to indicate the correctness of his opinion.

"It is not the education of children that can save the world from destruction; it is the education of adults. It is the adult who must be released from his narrow mindedness, his prejudices, his outworn customs, and his obsolete habits."<sup>1</sup> On every hand we have abundant evidence of the truth of this statement. If solutions are to be found for the vital problems upon which depend the survival of our present form of civilization, we must devise ways to educate or reëducate the adult. All this applies with peculiar force to the major health problems in which we are particularly interested.

It requires no argument to convince this group of the abundance of vital health problems which are literally crying for solution. Further, we all know that when we analyze one of these problems, in every case we give a prominent and important place in our proposed solution to what we call "education," and in these more modern days, "health education." Our discussion of adult health education, then, calls for a closer examination of what we mean by this term, and how it has become the newest shrine before which large numbers of public health workers now worship. Perhaps this analysis will also aid us in a wiser planning of our efforts to influence the attitudes and actions of the adult generation.

We have always considered the proper task of education to be the

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<sup>1</sup> Read at the Third Annual Meeting of the Western Branch American Public Health Association at Denver, Colo., June 9, 1932.

teaching of children. The school was invented for the purpose of providing help to the community in connection with certain needs of community life. It was natural for health workers to turn to the schools, when they sought to solve health problems by education. It had become a common method used by groups interested in the solution of social problems. Many of our earliest courses of instruction in hygiene and physiology were made compulsory by state laws promoted by an organized group interested primarily in the control of the use of alcohol and tobacco.

The first step in the evolution of our modern health education programs in schools came from a different quarter. An alliance of the physician, the health officer, the educator, and the health propagandist aroused a widespread interest in the responsibility of the schools for the health of its pupils. This has led to a gradual acceptance of health as an important objective of education. Slowly but surely, we are developing sound courses in health instruction, improved methods of health supervision, and properly trained and experienced personnel to conduct them.

The results of these health education programs are difficult to measure by our usual statistical methods. There seems to be no doubt, however, that they can and do definitely raise the level of the health intelligence and health practices of the students. We are concerned here with a consideration only of the elements entering into effective health education of children as a basis for evaluating and planning adult health education. For the educational principles underlying sound procedure will be alike for both age groups.

If you analyze any successful effective plan of health education, you will find it is always based upon sound scientific facts, it has proper provision for arousing and maintaining interest, and secures the voluntary, willing participation of the pupils. This results, even in a child, in a determined and long continued effort to train his powers of observation and thinking as a guide to his decisions in matters of health. While it is true that this result is not attained in all the pupils, it is surprising what a large number of children develop health ideals coupled with health knowledge in such a way as to put their elders to shame with their health wisdom. The weakest link in our health chain is found in the adult generation.

Our next big job is to devise and promote sound methods of adult health education. We need more than an emotional aspiration of health workers for better health as a basis for this task. It will necessitate our junking the pet theory that education is synonymous with schooling and terminates at the door of the school or college. We will

be compelled to realize that while we have neglected this important matter the field has been largely preëmpted by the quack, the charlatan, and commercial parasites who find the average adult an easy prey. It will be necessary for us to find ways to overcome the inertia or opposition of the average individual, who claims his ancient right to be ignorant, careless, thoughtless, and prejudiced about matters pertaining to health. We must seek as diligently for ways to arouse his interest as we have done for that of the child, and having gotten it—give it something substantial to feed upon. In fact, adequate health education will require skilful adaptation of our best educational methods to the attitudes and psychology peculiar to the adult.

Many of you protest that you have not neglected the field of health education. You ask: have we not given health lectures, shown health movies, published health literature, broadcast health talks, run health exhibits, promoted campaigns against various diseases, conducted prenatal clinics and mothers' classes? Yes—you have—and in many cases with remarkable skill and enthusiasm. They are all important and useful, as are many other efforts to reach the adult; but taken alone or even in combination they do not constitute "health education" in the sense we need to define it under modern conditions.

Really to educate an adult with reference to health you must do more than indoctrinate him by health propaganda—though that has its place. You cannot be satisfied merely to ladle out health information to him—though heaven knows he needs that. You must fight a terrific battle against indifference and stupidity among people who have demonstrated over and over again that they can be roused and controlled by catchwords and appealed to through simple emotions.

Our task then is to explore the principles and methods that have proved successful in producing real educational results in children and adapt them, if possible, to the adult level. The first step in such an endeavor would seem to be a critical review of the present methods of approach being used to influence the adult in his decisions on matters of health. These may be discussed for convenience under the head of health information, health propaganda, and health education.

A large part of the time and efforts of all health workers is devoted to giving out health information either to individuals or groups. This is a fundamental service without which the progress of our health programs would be delayed if not stopped. Consequently, an analysis of its place in an adult health education program is in order.

The first requisite of sound health information is that it be based upon facts. So-called health facts are frequently neither true nor important. The time has come for us to look a little closer at factual

bases of our health information. Armstrong,<sup>2</sup> in a recent article in the JOURNAL, proposes a current appraisal of health data:

- I. Assured Health Facts:
  - A. Those universally and practically applicable
  - B. Those theoretically sound but limited in application because of the imperfections in available methods or for other reasons
- II. Near Facts:
  - A. Those about which there is a growing certainty, though as yet no absolute scientific assurance
  - B. Those once generally accepted but about which there is an increasing element of doubt
- III. Assured Health Fallacies

He goes a step further by suggesting that we have some facts that can be labelled Grade A facts. Included here we find such items as the established fundamentals of diet and our exact knowledge about the prevention and cure of certain communicable diseases. Under Grade B—near facts—we discover many of the very appealing ones which we believe to be true, but cannot actually prove: "Drink 4, 6 or 8 glasses of water a day; sleep 8 hours a day; brush your teeth twice a day to prevent caries," and many more which we feel are in the right direction though they need verification. It seems unnecessary to dwell upon the health fallacies—properly classified as Grade C—and not to be used by careful, reputable health workers.

It seems obvious that sound health information has an indispensable rôle to play in any plan of adult health education. That legitimate health workers are bound by their own professional standards to evaluate carefully the truth of their factual materials, and to use these accurately and honestly, even though their competitors, the quacks and commercial parasites, are bound by no such standards.

#### HEALTH PROPAGANDA

The word propaganda has fallen on evil days. Its early history finds it describing efforts to convert men to the religious life. The war changed this meaning to represent everything that was horrible and terrifying. Notwithstanding its shady reputation, I want to speak a good word for propaganda, especially health propaganda, for it represents an organized effort for spreading the doctrine of health and the principles that govern it. Of course, in approving it, I am referring to the propaganda based upon facts, not on fallacy, fancy, or fraud.

True or wholesome propaganda is an effort to take the certified facts that science has shown will influence the levels of health and use

them accurately and honestly to influence the individual or group without any hope of personal gain. Whenever and wherever this standard is met by the individual health worker or the organization, we have one of our most useful and necessary tools.

To be true or wholesome the facts must be certified and the use must be accurate and honest. As an example, it is a certified fact that vaccination will prevent smallpox, and consequently we are justified in using every fair means to convince the individual that vaccination is desirable. It would be neither accurate nor honest to say that the procedure of vaccination never results in infection in the individual. A large part of the educational efforts of our official and voluntary health agencies may fairly be classified under the head of wholesome propaganda.

False propaganda is based upon facts or near facts improperly or dishonestly used, or upon definite fallacies. The propagandist is motivated by either commercial or selfish aims. It is in this field that we find one of the most potent influences against both individual and community health. We need not discuss the systems of propaganda based upon definite fallacies. They are dangerous and they present some of our most difficult public health problems.

We should be more concerned, however, about the enormous increase in the types of propaganda either based upon facts or near facts. Skilfully and adroitly used by well paid and frequently well trained individuals, they are pouring a golden stream into the pockets of commercial organizations and individuals. The most superficial reading of the advertising pages of our most highly circulated magazines yields an interesting crop. Health can be very simply attained by eating so much of this or that. Pictures of attractive young ladies, flanked by the inevitable "leading medical authority" (conveniently foreign) give what Armstrong calls "an aura of reality to what is mostly fiction."

And now comes the radio. One of the most deadly sources of dangerous propaganda is the uncontrolled broadcast. The commercial ones are bad enough, heaven knows, but they fade into insignificance beside the quack. It is high time that some active steps were taken to confine the statements of these individuals to as near the truth as are the labels on foods and drugs.

#### HEALTH EDUCATION

This term has surely come to be something to be conjured with. It seems to mean different things to different people. Many groups claim it as their own, such as educators, school physicians, public



health nurses, nutritionists, and physical educators. Lately one hears it applied to the publicity activities of numerous commercial concerns. The explanation of this condition probably lies in the fact that a part of the process is being mistaken for the whole. We will use it here to describe all of the methods, processes, and activities which, taken together, so arouse the interest of the individual in matters of health that he is willing to make a serious effort not only to acquire health knowledge but also to establish health habits and attitudes based upon such knowledge.

When we refer to adult health education we are referring to this broader conception, for we are convinced that if we are really to educate the adult in health we must do more than expose him to health propaganda and feed him health information. In fact *we* cannot "educate" him, he must educate himself, for we agree with Buttrick, when he says: "Education is a voluntary process. In the very nature of the idea, one must educate himself." Consequently, the first step in an adult health education program is to provide methods of arousing the interest of the individual in health. This is frequently well done through the popular lecture, newspapers and magazines, movies and radio. This must be followed systematically by the second step—the provision for adequate facilities for making easily available sound scientific health information. This may mean proper health literature adapted to the needs and curiosity of the interested individual. Or it may mean the encouragement of the person to attempt some more systematic study either in a group or through independent investigation. Or again, it may call for individual medical or health guidance.

To summarize the essential points: true adult health education is an active, not a passive, process; it is based upon a maintained intellectual interest; it results in seeking adequate health knowledge; and its outcome is an individual who is capable of exercising intelligent discriminating judgment in matters pertaining to personal and community health.

If asked whether adults can be interested in this type of program, I would answer that in other fields of endeavor they have been, wherever and whenever adequate leadership has been forthcoming. Recall the lyceums, university extension courses, Chautauqua movement, forums, and study courses of various organizations in this country, not to mention the workers' education movement abroad.

Yes, adults can be interested in health education if we are ready to furnish the leadership and to organize a program that will compete successfully for the interest of the individual. This means not only sound planning but also high grade promotion of the idea. The oppor-

tunity for the promotion of public health through adult health education has attractive possibilities. I am convinced that we have men and women who are capable of exercising the leadership. This brings us to our final question of how such a program can be organized and conducted in a community.

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Our first step is to decide what we consider should be the minimum essentials for health education in any community. While the extent and completeness of this program will be governed by local conditions, every community should have well organized and unified facilities for:

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*Schools*—While the actual program of health instruction in the schools is the job of the school administrator, it is a legitimate function of the group interested in community health to be sure that the schools have a satisfactory course of instruction properly integrated with the community health program.

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You will note you are familiar, and for bringing them to the attention of our health workers will come closer

Questions are all methods with which you are using. My purpose is for organization and unified objectives if we base our

health education programs upon the health needs of the whole community rather than the individual projects of our own organization.

As a definite application of this idea, it is suggested that we should organize a community council on health education, with representatives from the official health departments, educational system, voluntary health agencies, and professional groups such as physicians and dentists. This council would be an advisory and coördinating body. It might very well begin its activities by taking the following steps:

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2. *Community Program of Health Education*—With the survey as a basis, planning of a unified community health education program, including all age groups, this program to be adopted after adequate group discussion. The responsibility for the promotion of its individual projects to be allocated to the organization best equipped to carry it out effectively.

There is nothing original in this device for coördination of health activities. It has demonstrated its usefulness in many other fields. We believe that it will function in the field of health education. It is merely suggested as one method of securing a systematic, integrated plan of health education.

In conclusion, then, we may not be compelled to choose between "education and catastrophe," but we must choose between health education and failure of our public health programs. Health education of adults as well as children must become a well planned procedure based upon sound educational principles. Further, the success of our health plans as a whole will be conditioned by how clearly all of the health workers in the community see the necessity for, and are ready to participate in, a well considered, unified health education program.

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- 2 Armstrong, Donald B., Health Facts—What to Tell; *A. J. P. H.*, 22, 3:271 (Mar.), 1932.

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You will note that these suggestions are all methods with which you are familiar, and all or part of which you are using. My purpose for bringing them together is to make a plea for organization and unification of our health education programs. It seems to me that we will come closer to attaining our health objectives if we base our

health education programs upon the health needs of the whole community rather than the individual projects of our own organization.

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IN these times of curtailed outlet for industrial enterprise, individuals and corporations are looking, with a covetous eye, at the field of municipal undertakings and improvements. This will be even more true if funds for construction of public works and utilities become available from the Reconstruction Finance Corporation. Included in this program will be the construction or extension of sewerage and sewage treatment works.

Corporations having a staff of engineers and chemists, while casting about for new business and endeavoring to make the fullest possible use of existing facilities and personnel, in some instances have become attracted to one of the frequent municipal undertakings—sewage treatment and waste disposal. They see in sewage treatment a relatively undeveloped field with an apparent ample opportunity for the production of less complex, more practical and less costly processes than are now employed. As to the treatment of industrial wastes, there seems to be an even greater field in view. Some promoters have an idea of developing self-supporting features with by-product recovery from the treatment and disposal of the polluting materials at the minimum cost and without regard to attempted recoveries of



by-products. Still others have no interest in process development, but see only an outlet for mechanical units which may be applicable in one or several existing or proposed processes.

All or any of the proposed or projected schemes can work to the good of sanitation development by giving impetus to the movement toward stream cleansing, now well under way in America. If this new undertaking, strange to individuals and corporations uninitiated in the basic principles of waste treatment and requirements in stream pollution correction, is adequately guided by experienced engineers and chemists qualified to advise in such matters, the way will be smoother, and progress sounder and more rapid in the long run. Such advisers or consultants must be competent to understand what is required in the matter of degree of purification in given instances; wherein a particular process may be adequate or inadequate; wherein it will be able to produce results alone or may require amplification to the extent of some secondary treatment, biological or chemical. So far there has not appeared a simple and economical process which can be considered ample under all circumstances of stream condition and waste treatment and it does not seem probable that a single process will answer. There is need for greater flexibility than is economically procurable from a single process and it will be necessary for those developing new and unproved schemes to consider this feature carefully.

In marketing new schemes, or old ones which have been improved and amplified, it will be necessary to "sell" on *fact* and not on *fancy*. The process which produces an effluent pleasing to the eye, without odor nuisance, and void of elements dangerous to human or animal health, will answer the requirements in a great majority of instances, but there will be others wherein the residual but invisible organic matter in such an effluent may be more than the stream can assimilate during the critical periods when flows are deficient. During such periods amplification of the otherwise satisfactory treatment may prove essential.

Mechanical or chemical engineers thoroughly competent to develop industrial processes, and already proved successful in their field, may find themselves poorly understood by the sanitary engineer or the chemist of experience in stream pollution matters. These same men with the assistance of the experienced sanitarian, working in close coöperation and acting as an interpreter of the language and viewpoint of the state and national health departments or stream pollution commissions, may produce a process of waste treatment superior to any yet developed.

Producing and marketing novel processes and equipment for sewage treatment has not proved and will not prove as simple as the producers may expect, and much confusion will result unless these producers or promoters market the process on a sound technical basis with the aid of staff members or counsel qualified to evaluate pollution conditions and definitely assure economically sound performances commensurate with requirements. Disregard of such principles in marketing new sewage treatment processes by attempting to "sell" by other and less sound methods has not met with any real and material success in the past nor will it now.

### THE WASHINGTON MEETING

WE wish to call attention to the 61st Annual Meeting of the American Public Health Association, the time for which is rapidly approaching. Washington is the place, a city always full of interest from many different standpoints. Everyone wishes to go to Washington at least once a year, and this occasion will present an opportunity of attending a scientific meeting which is full of interest as well as of visiting the Capital City of our country. Other countries have been hit by the depression, but the attendance at scientific meetings has been good in spite of this, and we wish now and here to urge everyone who can possibly do so to be with us.

The preliminary program shows that there is certainly no depression in the production of scientific work, for which we have every reason to be thankful. While the program discusses matters of general interest on topics in which all are interested, in Washington there will be several special features. There will be five speakers on mental hygiene, all of whom are well known specialists. The prevention of diphtheria, the consideration of toxoids as against toxin-antitoxin, the standardization of serums, studies of the value of serums in the treatment of poliomyelitis, tests for anti-pneumococcic serum, and many other items will be considered. The program of the Laboratory Section is especially complete, and there are few matters of interest to laboratory workers which are not included in it.

There will be one paper on the relation of heart disease and public health. We have had a great deal of material on throat infections followed by rheumatism, on the tonsils as routes of infection and production of valvular disease of the heart; but very little has been written upon heart disease as a public health problem directly.

The Section on Food and Nutrition is also well filled, covering

many items of special interest. A new feature has been added—the Public Health Ten Star Final, in which specialists will give a symposium on the current work of the ten sections now composing our Association. The names of those taking part in this symposium assure us of its value and interest.

Another feature will be the Institute on Health Education, the purpose of which is to provide instruction in the content and methodology of health education to a limited number of persons actively engaged in this work.

At the same time that our meeting is going on, a number of other closely related societies, in which many of our members hold membership, will hold sessions, such as the American Association of School Physicians, International Society of Medical Health Officers, Conference of State Sanitary Engineers, State Laboratory Directors' Conference, Association of Women in Public Health, Delta Omega, American Social Hygiene Association, etc. Several of these have met coincidentally with us for several years; but this year we have in addition the National Shell Fisheries Association and Oyster Growers and Dealers Association of North America, with a program which includes many interesting items beginning with the biology of the oyster, and ending with the hygienic supervision of the shellfish business.

It scarcely seems necessary to mention the many attractions of the City of Washington, with its museums, art galleries, the wonderful Congressional Library, governmental departments, the National Institute of Health, etc. It was hoped that the new buildings of the National Institute of Health would be open in time for this meeting, but this expectation will not be fulfilled. However, the contracts have been let and the administration building is under way.

Once again we wish to urge all members to make every effort to be present so as to make our 61st gathering, the first annual meeting held in Washington since 1918, a great success.

# ASSOCIATION NEWS

WORD has been received that President Hoover will honor the American Public Health Association by appearing before it at some occasion during the sessions of the Sixty-first Annual Meeting, if it is at all possible for him to do so. No one will doubt that Mr. Hoover's wishes in the matter are to bring a greeting to the Association. His absorbing interest in public health is too well known to need comment.

Mr. Hoover has been an Honorary Fellow of the American Public Health Association since 1917. He is Honorary President of the American Child Health Association and President of the American National Red Cross.

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

### *Health Officers Section*

P. P. Causey, M.D., Courtland, Va., Southampton County Health Officer  
Frederick E. Clark, M.D., 316 New York Ave., Ogdensburg, N. Y., Health Officer  
Charles W. Decker, M.D., 116 Temple St., Los Angeles, Calif., Health Officer  
Theodore F. Foster, M.D., Board of Health, West Hartford, Conn., Superintendent of Health  
Jacques P. Godard, 10 rue des Archers, Lyon, France, Public Health Administration (Assoc.)  
Burdge P. MacLean, M.D., 33 Fairview St., Huntington, N. Y., Deputy Commissioner of Health  
Harry E. Ransom, M.D., City Health Dept., Des Moines, Ia., Health Commissioner  
Elwin F. Reamer, M.D., P. O. Box 1598, Modesto, Calif., Stanislaus County Health Officer  
J. W. Scudder, M.D., Calhoun, Ky., Director, McLean County Health Dept.

### *Laboratory Section*

Elmer J. Pearson, Box 1304, Minot, N. D., Bacteriologist, Minot Branch Laboratory

### *Public Health Engineering Section*

Ben L. Grimes, Jr., Box 881, San Angelo, Tex., District Engineer, State Dept. of Health

Robert H. Murray, C.E., Dept. of Public Health, Regina, Sask., Director, Division of Sanitation  
E. C. Sams, 614 E. Burton St., Murfreesboro, Tenn., Sanitary Inspector, Rutherford County Health Dept.

### *Industrial Hygiene Section*

Elston L. Belknap, M.D., 231 W. Wisconsin Ave., Milwaukee, Wis., Medical Director, Globe Union Manufacturing Co.  
Ernest T. Manning, M.D., Rm. 1224, Telephone Bldg., Omaha, Nebr., Health Director, Northwestern Bell Telephone Company

### *Child Hygiene Section*

Arthur S. Lamb, M.D., McGill University, Montreal, P. Que., Director, Dept. of Physical Education  
Mary E. Morse, M.D., Wine Ave., Hyattsville, Md. (Assoc.)  
Elizabeth C. Wells, M.D., 513 W. Main St., Riverhead, N. Y., School Physician

### *Public Health Nursing Section*

Leah M. Blaisdell, R.N., State Dept. of Health, Albany, N. Y., Assistant to the Extension Secretary, Staff Education Program for Public Health Nurses of New York State  
Florence D. Fischer, R.N., Washington County Health Dept., Jonesboro, Tenn., Public Health Nurse

Betty M. Pennington, R.N., Obion County Health Unit, Union City, Tenn., Public Health Nurse

Vincent Saccardi, 4815 17th St., N. W., Washington, D. C. (Assoc.)

Gertrude G. Shay, R.N., Metropolitan Life Insurance Company, Jersey City, N. J., Local Supervisor, Nursing Service

Emily M. Smith, R.N., Washington County Health Unit, Jonesboro, Tenn., Public Health Nurse

Mary E. Walker, 1601 Bolton St., Baltimore, Md., Superintendent, Instructive Visiting Nurse Association

#### *Epidemiology Section*

Gaston Melo Andrade, Depto de Salubridad, Paseo de la Reforma y Calzada de Tacubaya, Mexico, D.F., Mex., Chief, Public Health Dept.

Burke Diefendorf, M.D., Copake, N. Y., District State Health Officer

Charles H. Halliday, M.D., 3505 N. Calvert St., Baltimore, Md., Epidemiologist, State Dept. of Health

#### *Unaffiliated*

C. T. Conway, U. S. Standard Products Co., Merchandise Mart, Chicago, Ill. (Assoc.)

J. O. Dean, M.D., Lawrenceville, Va., U. S. Public Health Service

#### ADDITIONAL APPLICANTS FOR FELLOWSHIP \*

HEALTH OFFICERS SECTION—John D. Monroe, M.D., Pontiac, Mich., Vladimir K. Volk, M.D., Dr.P.H., Pontiac, Mich.

LABORATORY SECTION—James Gibbard, M.Sc., Ottawa, Ont., Canada, Edward L. Miloslavich, M.D., Milwaukee, Wis.

VITAL STATISTICS SECTION—Lloyd R. Gates, D.P.H., Ann Arbor, Mich.

#### DECEASED MEMBERS

Lafayette Higgins, Des Moines, Ia., Elected Member 1913, Fellow 1922

Mathilde S. Kuhlman, R.N., Albany, N. Y., Elected Member 1920, Fellow 1927

Davis Furman, M.D., Greenville, S. C., Elected Member 1929

O'Neill Kane, M.D., Kane, Pa., Elected Member 1928

Cassius T. Lesan, M.D., Mount Ayr, Ia., Elected Member 1929

\* See JOURNAL, Aug., p. 847, and Sept., p. 947.

Members and subscribers are requested to send notification of any change of address to the office of the Association as promptly as possible.

# PUBLIC HEALTH ADMINISTRATION

Baltimore Health and Hospital Survey—A comprehensive survey report of the health and hospital service in Baltimore for the year 1931 has been prepared by Surgeon Joseph W. Mountin of the U. S. Public Health Service. The survey staff functioned under a large Citizens Committee and sub-committees concerned particularly with executive problems, general administration, communicable diseases, maternity and infancy, hygiene of the school child, general sanitation, and hospitals.

The city health department budget for 1932, of \$719,336, is 20.3 per cent below that of the preceding year. The proportional reduction in personnel and activities is about the same. The sum expended by the health department represents only a small part of the total expenditure of the city and—

It would seem that Baltimore might very well devote a larger percentage of its tax dollar to health purposes, since with advancing science health becomes more and more a purchasable commodity.

Experience has demonstrated that a health program becomes a more potent influence when activities are localized. Certain functions, notably child hygiene and nursing, are being developed on a neighborhood basis, but there should be administrative decentralization as well. A limited number of sub-offices should be established at strategic points throughout the city for the distribution of existing services.

Regarding personnel, it is considered desirable as the future policy to employ full-time trained public health workers for the administrative and regulatory functions of the health department and to draw on the practicing physicians with special training when filling clinical positions requiring only part-time service. The formation of a Council of

Health Agencies is suggested. On this Council would be represented the various official and nonofficial organizations engaged in public health and related activities. It could serve as a forum for the discussion of projects affecting two or more member agencies; it would be a medium for interpreting public health work to the people, and a means for organizing public support of the work. In addition, it is believed that the position of the health commissioner would be strengthened were he to assemble a group of consultants to whom he could turn for advice on particular problems.

This carefully prepared document charts a course for future development of public health work in the city along lines which seem sound in the light of modern knowledge. Many of the principles set forth should prove of practical interest to many health administrators.

I. V. H.

Ontario County, N. Y.—In a survey conducted in June, 1930, there was summarized an outline of the existing health facilities of Ontario County, official and voluntary, town, village, and county, with a recommendation that there should be only one health agency in the county. Surprisingly it is shown that a modern consolidated full-time health organization with well trained personnel will cost the taxpayers less than the obsolete township system now in effect. The principal stumbling block to progress seems to be the 14 town and village health officers who are dependent in part, at least, upon their meager stipends.

Ontario not only blazed the trail in the pioneer days of New York State

when it included within its boundary all the territory west of Albany, but it was the first New York county to boast, in 1906, of a county public health laboratory. Its tuberculosis hospital has been in operation since 1910. It is one of two counties in the state which have taken advantage of the state law permitting the organization of a county school hygiene district.

With a population of 54,239 in 1930 a preliminary estimate of budget is placed at \$76,760 to include a health officer and assistant, 16 nurses including a chief, half time of a tuberculosis officer (who will also be superintendent of the sanatorium), 3 inspectors, a clerk, a stenographer, \$16,000 for travel, \$7,000 for laboratory, \$1,000 for office expense and \$4,000 for miscellaneous expense.—Allen W. Freeman, Survey of Health Organization, New York State Charities Aid Association, *Pub. 198*, 1932.

**Administrative Practice in Scarlet Fever**—As of 1930, a detailed examination has been made of the isolation and quarantine requirements for scarlet fever in 44 of the larger cities of the United States. In many instances the regulations are decidedly confused and often indefinite. There is also a lack of uniformity in principles involved. There should be prepared minimal re-

strictions compatible with safeguarding the public health. There is need for clarification of terms and better understanding of the technics involved. Also, uniform terminology would permit progress through comparison of experiences. Evaluation of the bacteriological methods now in vogue, the effect on the communicability of scarlet fever, of degrees in type of disease, age of patient, and geographical and seasonal variations are only a few of the relationships to be determined.—George B. Darling and John E. Gordon, *American Administrative Practice in the Control of Scarlet Fever. J. Prev. Med.*, 6:185 (May), 1932.

**Poliomyelitis in San Francisco**—In 1930, the California district experienced its most extensive outbreak of poliomyelitis. Beginning in June, 1930, the epidemic continued through the following March. There were reported 245 local and 50 non-local cases, and 32 deaths. Although no part of the city was free from the disease, it was found that the prevalence was directly proportional to the density of population. Males were affected more frequently than females and 75 per cent of the males were hospitalized.—J. C. Geiger and J. P. Gray, *Statistical Study of Poliomyelitis in San Francisco in 1930, J. Prev. Med.*, 6:145 (May), 1932.

# LABORATORY

## THE GREENBURG-SMITH IMPINGER SAMPLING APPARATUS FOR DUSTS, FUMES, SMOKE, AND GASES<sup>1</sup>

LEONARD GREENBURG, M.D., PH.D., F.A.P.H.A.

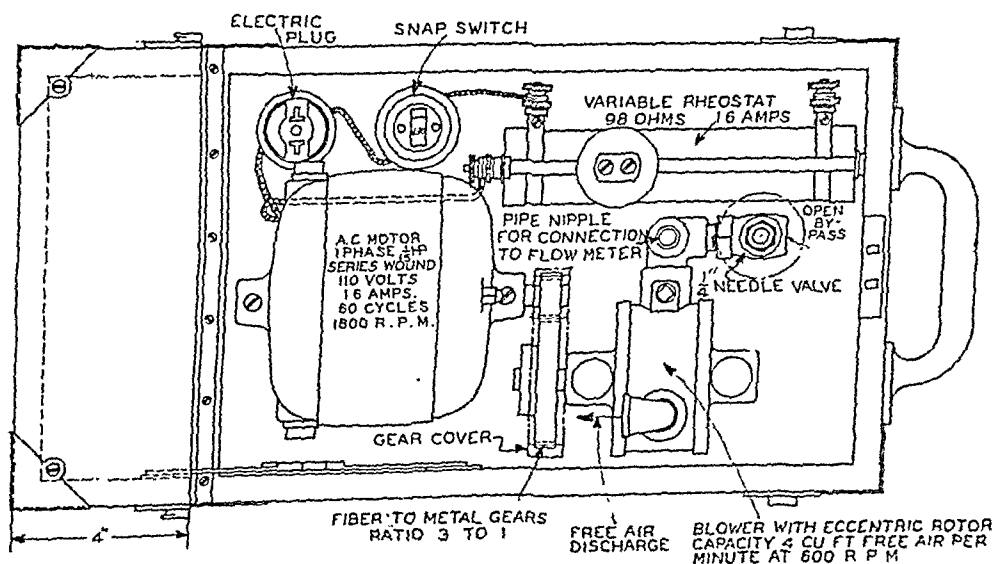
*Department of Public Health, Yale School of Medicine, New Haven, Conn.*

ONE of the most important of present-day problems in the field of industrial hygiene is that concerned with the effects of the dust which the worker is forced to inspire by virtue of his occupational exposure. In the study of such problems it is essential to obtain accurate information concerning the amount, size and nature of the dust suspended in the air of the workroom.

The Greenburg-Smith impinger apparatus was designed by the writer and G. W. Smith for the purpose of sampling aerial dust.<sup>2</sup> This instrument was found to be superior to the others tested at the U. S. Bureau of Mines during the

course of a detailed study of the sampling efficiencies of the various instruments available for this purpose.<sup>3</sup> When operating at a sampling rate of 1 cu. ft. per minute this instrument possesses high catching efficiency when tested against dust or smokes. A representative sample may therefore be obtained in a relatively brief sampling period. With this instrument any suitable liquid may be used as the sampling medium which may then be studied microscopically or analyzed chemically.

On the completion of the laboratory studies this instrument was placed in field use. For the past 9 years it has



TOP VIEW  
FIGURE I—ELECTRICALLY DRIVEN SUCTION APPARATUS  
[1077]



been used with a high degree of success for the sampling of normal outdoor air, of various industrial dusts, of lead dust, coal dust, of chromic acid mist, of lead fumes, and of sulphur dioxide. The present note is presented at this time so that persons requiring an instrument for the sampling of fumes, gases, smoke or dusts may be familiar with this device.

#### THE IMPINGER APPARATUS

The impinger apparatus consists essentially of two portions: First, a source of sufficient suction to draw the air to be sampled through the sampling device; and second, the sampling device or impinger itself, which consists of a container and the impinger tube and plate. As a source of suction we have

made use of an electrically driven and a compressed air driven apparatus.

#### ELECTRIC SUCTION APPARATUS

The electrically driven suction apparatus (see Figures I, II and III) is designed to be used in places where electrical energy is available. The motor is a series-wound, single-phase 60-cycle, alternating-current motor of 1/15 h.p., rated at 1.6 amperes, at 110 volts, with a speed of 1,800 r.p.m. and operates on either alternating or direct current. It is geared to a positive pressure blower of the Roots type by means of a set of gears having a 1 to 3 ratio. In order to minimize noise, the smaller of these gear wheels is made of fiber, the larger being metal. The blower is rated at 4 cu. ft. of free air per minute at a speed of 600 r.p.m., and is used as the source of suction. Wired in series with the electric motor is a 98-ohm, 1.6-ampere variable sliding rheostat used for speed control of the motor. By employing such a rheostat, 110 or 200 volts may be used. To the intake or suction side of the blower is attached a 1/4" malleable-iron elbow fitting provided with two inlets. To one

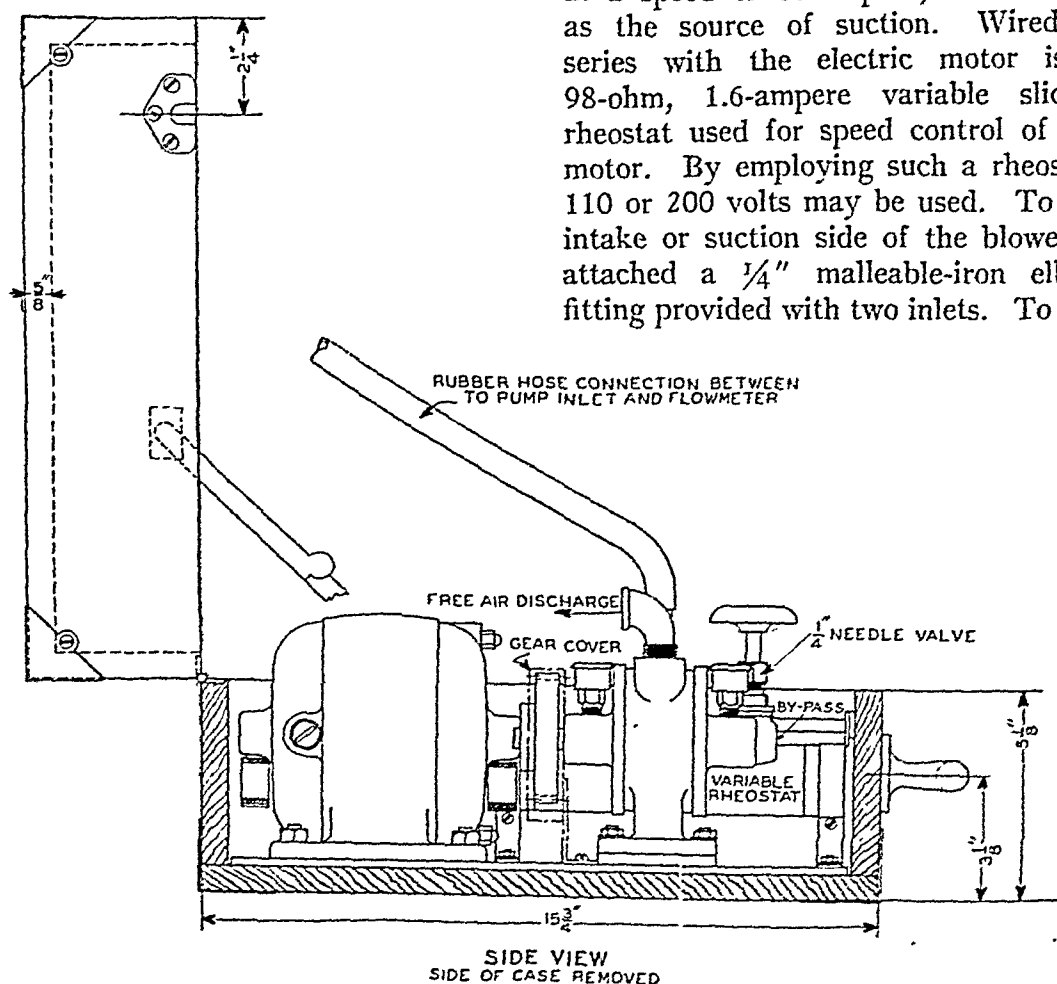


FIGURE II—ELECTRICALLY DRIVEN SUCTION APPARATUS

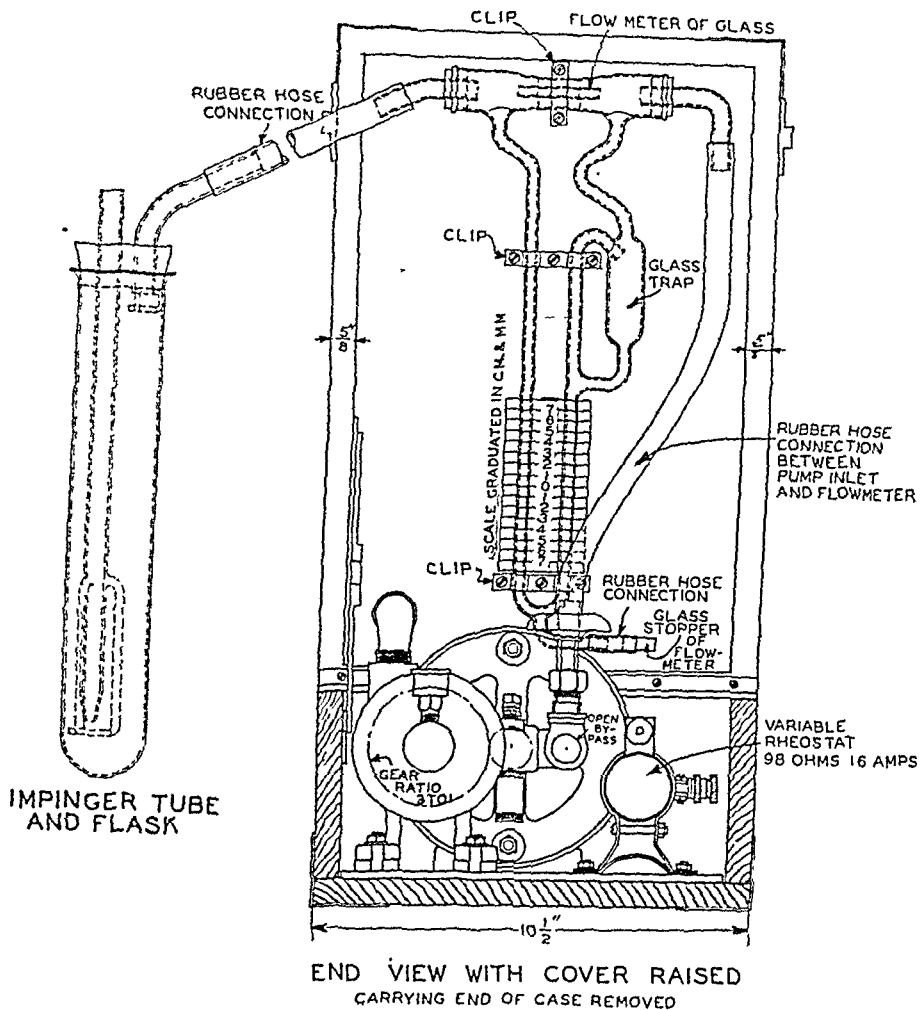


FIGURE III—ELECTRICALLY DRIVEN SUCTION APPARATUS

of the inlets, a  $\frac{1}{4}$ " brass needle valve by-pass is attached. The second inlet of the elbow is connected to a constriction type glass flowmeter or vacuum gauge for measuring the rate of air flow. The inlet side of the flowmeter is connected to the sampling flask by means of a piece of non-collapsible rubber tubing, of any suitable length.

The electric motor, blower, rheostat, electric plug, and switch are all assembled on a metal plate 9" by 14" and  $\frac{1}{8}$ " in thickness, and this plate is in turn firmly screwed to the base of the carrying case. The carrying case is made of  $\frac{1}{2}$ " quartered oak, the outside dimensions being  $10\frac{1}{2}$ " by  $15\frac{1}{2}$ " by  $9\frac{1}{4}$ ". The weight of the apparatus is 45 lb.

#### COMPRESSED-AIR SUCTION APPARATUS

In many industrial establishments, mines, and quarries, compressed air is readily available. By means of a very simple device called an ejector, the compressed air may be converted into suction which is then used for the sampling of the atmospheric dust (Figure IV).

The inlet (compressed-air) side of the ejector is provided with an adapter so that the usual  $\frac{1}{4}$ " nipple, as ordinarily used for small compressed air lines, may readily be attached. To the suction side of the ejector, a  $\frac{1}{4}$ " iron tee is attached, and to the outstanding leg of this tee a second tee connection is fitted. To the outstanding leg of the second tee, an ordinary vacuum gauge,

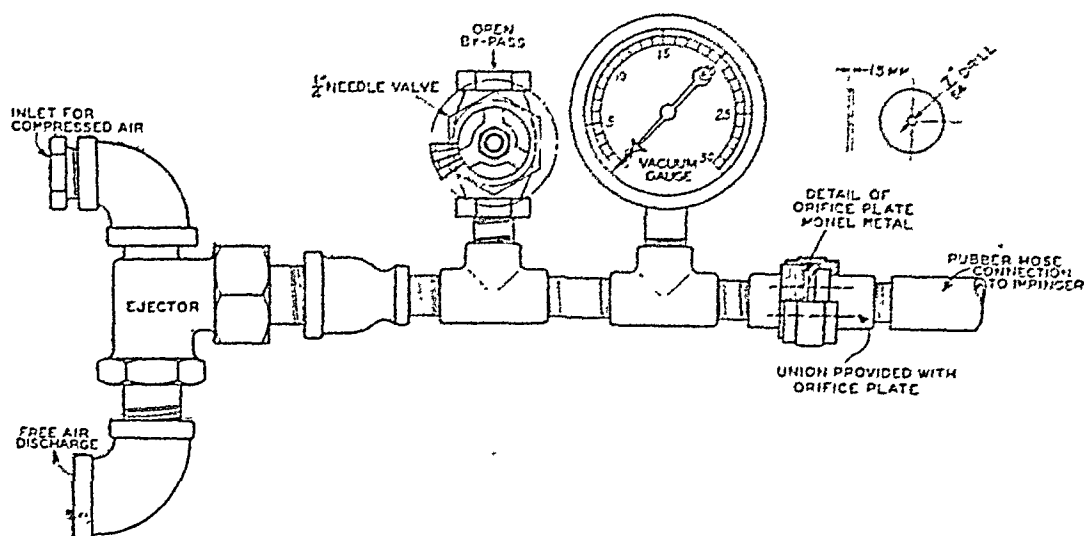


FIGURE IV—COMPRESSED AIR DRIVEN SUCTION APPARATUS

for measuring the rate of air flow, is connected, while to the other leg there is attached an ordinary  $\frac{1}{4}$ " pipe union. Finally, to the unoccupied end of this union is fastened a short pipe nipple over which a suitable length of rubber tubing is attached.

Between the two halves of the pipe union there is placed a Monel metal disk approximately 1.5 mm. in thickness, pierced at its center by a circular orifice  $\frac{7}{64}$ " in diameter. By employing such an orifice plate, it is possible to obtain a gauge reading approximately double that obtainable without the use of this device.\*

The ejector type of instrument weighs approximately  $3\frac{1}{2}$  lb.

#### IMPINGER TUBE AND FLASK

The impinger tube is constructed of a piece of heavy wall pyrex glass tubing 13 mm. in outside diameter, approximately 325 mm. in length (this length is optional), tapered at its lower end to a stream-line form with a terminal orifice of 2.3 mm. diameter. The impinger plate is of pyrex glass approximately 25 mm. in diameter, 3 mm. in thickness and is fastened to the

impinger tube by means of three glass supporting rods about 9 cm. in length, so that the distance between the orifice of the tube and the plate is 5 mm. (Figure V).

There is wide latitude in the choice of the sampling flask which may be used in conjunction with the impinger tube. In fact, we have employed three different flasks during the course of our studies. The choice is governed by the

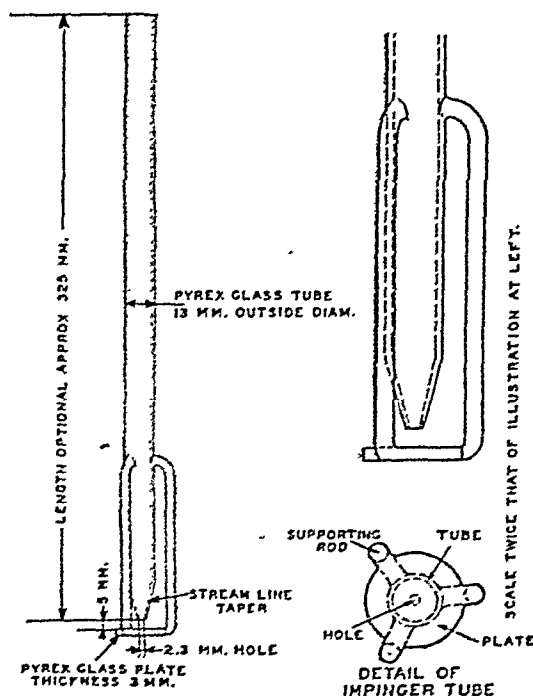


FIGURE V—IMPINGER TUBE

\* We are indebted to Theodore Hatch, Harvard School of Public Health, for the design for this orifice plate attachment.

requirements of the particular task at hand.

At the present time we are using a flask made in the form of a tube sealed at the lower end, 300 mm. in length and 50 mm. in diameter, provided with a 2-hole rubber stopper (Figure VI). The outlet tube from the sampling cylinder is connected to the source of suction by means of a convenient length of non-collapsible rubber tubing.

Whether bottle flask or cylinder is used, sufficient liquid should be kept in the container during use to cover the impinger plate to a depth of approximately 3 cm. In the cylinder type of flask 100 c.c. are sufficient to accomplish this, whereas if the Erlenmeyer type of flask is used, 250 c.c. are required. A baffle plate on the exhaust tube, as shown in Figure VI, is of value for the prevention of entrainment of water from the sampling flask.

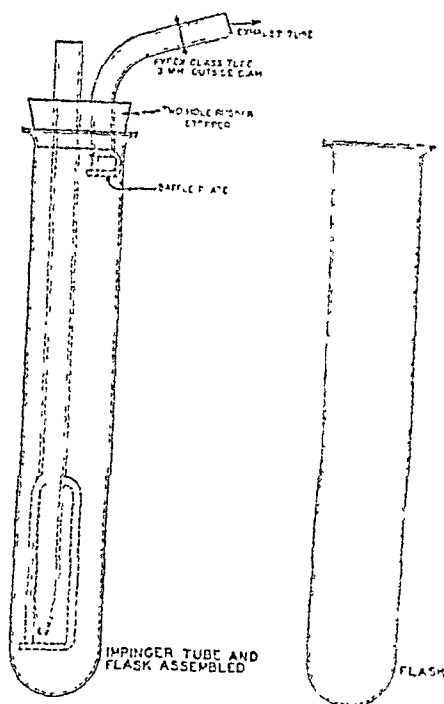


FIGURE VI—GLASS SAMPLING CYLINDER AND COMPLETE IMPINGER

#### METHOD OF SAMPLING—CALIBRATION OF THE IMPINGER APPARATUS

It is necessary to calibrate the vacuum gauge or flow meter air measuring device of the impinger apparatus so that one may control the rate of air sampling. For calibration, the apparatus should be assembled in a manner precisely similar to that employed in field sampling, but with the outlet tube of an accurate 5-light, dry, test gas meter attached to the inlet of the impinger apparatus. A calibration curve is then obtained, showing the relationship between rates of air flow, as measured by the gas meter during observed intervals of time, and the readings on the scale of the flow meter or vacuum gauge. The scale reading corresponding to 1 cu. ft. per minute may then be ascertained from the calibration curve.

#### SAMPLING FLUID

The choice of the sampling fluid is dependent on the analyses contemplated. In studies of non-toxic indus-

trial dusts we employ distilled water. In the case of those dusts not easily wetted by water, such as coal dust, a mixture of 25 per cent alcohol and 75 per cent water has been employed with excellent results. The alcohol increases the wetting power of the solution and at the same time greatly reduces the solubility of mineral dusts in water. It is important that the sampling fluid itself be comparatively free from suspended matter.

For the sampling of  $\text{SO}_2$ , Smith and Friis<sup>4</sup> have employed 0.1 normal sodium hydroxide, and for the sampling of chromic acid mists, Bloomfield and Blum<sup>5</sup> employed normal sodium hydroxide.

In the preparation of the apparatus and solutions for field use the degree of care and the precautions usually exercised in quantitative chemical work should be adhered to.

#### SAMPLING AND ANALYSIS OF DUST SAMPLES

In the field the apparatus is assembled and set up in a suitable place, the proper

amount of sampling fluid is placed in a flask and the impinger tube is placed in position. The flask, with its tube, is then placed in the chosen sampling position and the suction is started. It is important to note that sampling should be carried out at a rate of 1 cu. ft. per minute since the dust catching efficiency of the instrument is decreased when a lesser sampling rate is used. After a suitable period of time the instrument is shut down, the impinger tube is rinsed with distilled water, the rinsings being added to the original sampling fluid, and the flask stoppered for transport to the laboratory.

In the laboratory the dust suspensions are filtered through a 325-mesh screen and then diluted so that the number of particles in the microscope field is equal to approximately 50 to 75. Two or more 1-c.c. portions are placed in Sedgwick-Rafter cells for counting. The microscope is of the ordinary type employing a 7.5 x eyepiece and a 16 mm. objective. A Whipple disc eyepiece micrometer is placed in the microscope eyepiece and the microscope tube length is adjusted so that the side of the ruling

in the eyepiece is 1 mm. in length. As a source of illumination we employ the ordinary type of microscope lamp with the iris of the Abbé condenser system adjusted so as to provide a high degree of visibility. In making counts the microscope should be focused throughout the depth of the cell, since some particles may remain in suspension. It is, of course, necessary to make control dust counts on the sampling fluid.

NOTE: For a more complete description of the counting technic the reader is referred to the contribution in the *Public Health Reports* of March 18, 1932.

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2. Greenburg, L., and Smith, G. W. A New Instrument for Sampling Aerial Dusts. Bureau of Mines, *Reports of Investigations No. 2392*, Sept., 1922.
3. Katz, S. H., Smith, G. W., Myers, W. M., Trostel, L. J., Ingels, Margaret, and Greenburg, L. Comparative Tests of Instruments for Determining Atmospheric Dusts. *Pub. Health Bull.*, 144 (Jan.), 1925.
4. Smith, R. B., and Friis, B. S. T. Portable Motor-driven Impinger Unit for Determination of Sulphur Dioxide. *J. Indust. Hyg.*, 13, 10:338 (Dec.), 1931.
5. Bloomfield, J. J., and Blum, William. Health Hazards in Chromium Plating. *Pub. Health Rep.*, 43, 36:2330 (Sept.), 1928.

## JOINT STATEMENT OF AMERICAN WATER WORKS ASSOCIATION AND AMERICAN PUBLIC HEALTH ASSOCIATION ON PROCEDURE FOR ISSUING STANDARD METHODS FOR THE EXAMINATION OF WATER AND SEWAGE

THE importance of a standard laboratory technic for examination of water and sewage is recognized by all. The mechanics of reaching agreement upon such standard methods, however, is not so generally understood or accepted. Varied interests, conflicting opinions, prejudices of one kind or another, and the sheer mechanical difficulty of reconciliation of many groups

have retarded increasingly in recent years the prompt issuance of a manual acceptable to the field at large. Some of this delay has been due to frank differences of opinion regarding choice of technic, but a much greater part has had its origin in administrative obstacles to agreement, to lack of opportunity for direct personal contact for exchange of ideas by members of the responsible

committees, and by research committees attempting to function as executive agents.

The increasing dissatisfaction of many workers in the field with the current standards and the unfortunate departure of many important laboratories from the use of *Standard Methods* made it essential for both the American Public Health Association and the American Water Works Association to find some procedure for facilitating the prompt issuance of *Standard Methods*, commensurate with the current acceptance of new or modified procedures. A review of the situation by interested groups disclosed quite clearly that the most fruitful direction for bringing about this desideratum was in the creation of a small, compact, editorial committee, distinct from the investigating committees, whose sole function should be the crystallization of current thought and data into prompt publication for use. The basis for the operations of this committee naturally remains in the research groups of the respective associations, but the mechanics of formulation of technic was regarded as more likely to be efficiently performed by a small group than by large, discrete, and loosely knit research committees. Their functions likewise were thought to be quite distinct.

In the light of these conclusions, it appears advisable to inform the membership of the American Public Health Association and the American Water Works Association as to the changes which have been made in personnel for and methods of preparation of new editions of *Standard Methods for the Examination of Water and Sewage*.

By an agreement which became effective in 1925, this manual of methods, which had formerly been prepared by the American Public Health Association alone, became the product of the coöperative activity of the two associations. Since that time certain adminis-

trative reorganization has taken place or became effective in both associations.

In the American Public Health Association, the Committee on Research and Standards has become the clearing house through which proposals for research projects are routed and to which the Association as a whole looks for coördination and direction of all research work. In the American Water Works Association the Committee on Water Works Practice occupies a similar position and performs a similar function.

While it is doubtless unnecessary to point out to most workers in this field, it may be worth while, for the benefit of a few who may not have thought the subject through, to recall that the establishment of such associational clearing houses of research and group activity is becoming more widespread and has its highest development in certain national organizations most conspicuous for their activity and excellent performance.

The chairmen of the two associations' committees, after a review of the progress that was being made under the 1925 joint editorial agreement, have obtained the approval of their respective boards of directors to a reorganization of the groups engaged in editing *Standard Methods*.

This reorganization consists briefly in the appointment of a joint Editorial Committee of six—three from each association—who have organized and have been functioning as a single committee since the Memphis Convention of the American Water Works Association.

The members of the Joint Editorial Committee are:

*American Public Health Association*

John F. Norton, Detroit, Mich.

A. M. Buswell, Urbana, Ill.

L. M. Wachter, Albany, N. Y.

*American Water Works Association*

Wellington Donaldson, New York, N. Y.

Paul Hansen, Chicago, Ill.

*Chairman:* Harry E. Jordan, Indianapolis, Ind.

This joint committee is empowered to carry on all the negotiations incidental to the preparation of new and revised editions from time to time, to the point of detailed and complete formulation of manuscript. After the completion of such manuscript, the material is to be submitted to the two parent associations for the detailed ratification which those associations may determine upon in their own practice. Funds have been allotted for the work of the committee.

In the American Water Works Association the manuscript will be submitted to the Chairman of the Committee on Water Works Practice who will, after satisfying himself and his committee, through whatever channels appear wise, as to the character of the material submitted, approve it and forward it to the Secretary of the association. A like copy of the manuscript will be forwarded to the Chairman of the American Public Health Association Committee on Research and Standards. He will obtain the approval of the manuscript by his committee, after similar intra-association review, and forward the material to the Secretary of the A.P.H.A.

The approved manuscript is then to be printed and bound under the direction of the General Secretary of the A.P.H.A. An annual accounting for expenses and receipts connected with the preparation and sale of *Standard Methods* will be made by the secretaries of the two associations.

It is planned that such research on methods as may be organized in the A.W.W.A. shall take the form of appointments by the Chairman of the Water Purification Division with the advice of the Joint Editorial Committee and the approval of the Committee on Water Works Practice. Whenever it becomes evident to the Editorial Committee that a revision of an item of current procedure is needed or whenever the members of the Water Purification

Division in regular meeting by their action indicate a similar conclusion, a research or revision group may be organized to study the particular subject. Such research groups are to be appointed for 1 year only, and will be expected to make a report at a regular meeting of the division. If, in the opinion of the Joint Editorial Committee, it is evident that the study has not reached a status that justifies a change in current procedure, the research group may be re-appointed for another year with such additions to or changes in personnel as may be indicated. The policy of a definitely limited term of appointment of research groups is adopted as a means of accelerating results rather than of restraining the activities of any individual or group.

On the other hand, the Joint Editorial Committee is charged with the responsibility of contact with all research wherever organized as it may relate to the subject matter of *Standard Methods*. Whenever it becomes evident that the validity of research by any person or group is amply demonstrated, it is expected that a proper change will be made in the text of *Standard Methods*.

While the standing of the text on *Standard Methods for the Examination of Water and Sewage* has rested in the past upon its adaptability to the determination of the sanitary and chemical characteristics of natural waters or those only slightly changed from their natural condition, it has become evident that the text should include data concerning determinations on highly modified waters for steam boiler purposes.

The Joint Editorial Committee is already in agreement with the Chairman of the A.W.W.A. Committee on Boiler Feed Water Studies, that whenever his committee is in agreement as to the technic of such determinations, the Joint Editorial Committee will expand *Standard Methods* to contain the material.

The Joint Editorial Committee will endeavor to keep adequately informed as to the activities of water quality research committees in the National Electric Light Association, American Gas Association, American Railway Engineering Association, American Society for Testing Materials, and other organizations of similar scope.

Its coöperation with the Committee of the American Chemical Society and the Society of American Bacteriologists is thoroughly established. Contact has already been established with the Laboratory Methods Coördination Committee of the Great Lakes and Ohio River Board of State Sanitary Engineers. It is anticipated that, whenever the Federation of Sewage Works Associations organizes research studies

on methods applicable to the sewage field, the fullest harmony will exist and that whenever new or modified methods are developed, they will be readily accepted by the Joint Editorial Committee for inclusion in *Standard Methods*.

A new edition of *Standard Methods* will issue this autumn, and it is anticipated that, with the coöperation of the various research committees, future revisions will appear as promptly as the extent of revised material justifies the expense of a new edition.

ABEL WOLMAN, for the Committee on Research and Standards—A.P.H.A.

MALCOLM PIRNIE, for the Committee on Water Works Practice—A.W.W.A.

## VITAL STATISTICS

**Vital Statistics for West Virginia, 1931**—There were 39,325 births reported in West Virginia during 1931. The birth rate was 22.4 per 1,000 population, by far the lowest rate since 1925, when West Virginia was admitted to the registration area. At that time the birth rate was 27.7. Of the total number of births in the state, 94.7 per cent were among the white population and 5.3 per cent among the colored. The stillbirth rate, 38.8 per 1,000 live births, was higher than in 1930 when it was 37.1.

In 1931 there were 17,620 deaths from all causes, 600 less than in 1930, the death rate in 1931 being 10.0 per 1,000 population as compared with 10.5 in 1930. Among the notifiable diseases, typhoid fever (showing a death rate of 12.7 per 100,000 in 1931), diphtheria (9.3), influenza (34.0), and poliomyelitis (1.3) showed increases over the 1930 rates, while measles (2.3), scarlet fever (1.7), whooping cough (7.5), and

tuberculosis (60.1) showed declines in 1931 over 1930.

Among the principle causes of death, the mortality from cancer (all forms) decreased from 59.7 per 100,000 population in 1930 to 58.6 in 1931. The fact that there was a decrease instead of an increase in cancer mortality is noteworthy, especially in view of the strikingly low rate which West Virginia showed in 1930.

Diseases of the heart declined from 117.0 in 1930 to 111.3 in 1931 and diseases of the circulatory system from 146.3 to 130.4 for the same years respectively. A marked decline is shown for diarrhea and enteritis under 2 years, the rate for 1931 being 54.6 as compared with 70.3 for the previous year. The maternal mortality rate was 5.2 per 1,000 live births. In 1930, it was 5.6. The largest percentage of puerperal deaths was due to septicemia. Apoplexy (68.3 in 1931), diseases of the nervous system (95.3), alcoholism (5.1),



nephritis (64.9), and syphilis (9.5) showed increases over the rates for 1930.

The infant mortality rate for the state as a whole, during 1931, was 77.2 per 1,000 live births, as compared with a rate of 80.9 in 1930. Five counties, Clay, Tucker, Jefferson, Mineral, and Wirt, showed infant mortality rates of over 100.—*West Virginia Quart. Bull.*, 19:4-6 (July), 1932.

**Accidental Deaths Drop 2,000 in 1931**—Accidents in the United States during 1931 caused approximately 97,000 deaths and 10,000,000 non-fatal injuries.

Staggering as the figures sound, the fatality total is 2,000 less than in 1930 and 1,000 less than in 1929. The reduction from 1930 is accounted for by a net decrease of 1,500 industrial deaths and of 1,000 home fatalities. Motor vehicle accidents caused 500 more deaths in 1931 than in the previous year. Incidentally, this reduction in the total accidental deaths is the first reduction that has been recorded since 1922. The death rate stood at 78.2 per 100,000 population in 1931, the lowest rate since 1925 when the rate was 75.7. The accident rate in the United States is still three times as high as that of Denmark, approximately twice that of Japan, and 50 per cent higher than that of France.

Steam railroads established an all-time safety record in 1931. There were fewer fatalities during the year than in any year since 1888, when the Interstate Commerce Commission's records begin. There were 5,099 deaths last year, compared with 5,481 in 1930.

Approximately 33,500 deaths occurred in motor vehicle accidents during 1931. This may be contrasted with 32,929 in 1930, 24,430 in 1926, and 13,939 in 1921. Of the 45 states reporting on motor vehicle deaths, 27 participated in the upward movement. Largest increases occurred in Nevada, Wyoming,

and Montana. Among the states showing declines, New Mexico and Arizona lead the list with drops of 35 and 14 per cent, respectively. Pennsylvania, Ohio, and Michigan, among the larger states, also had fewer deaths in 1931 than in the previous year. Based on the provisional figures, Nevada has the highest 1931 death rate, with California second. North Dakota has the lowest rate—15.5 per 100,000 population—followed closely by Mississippi, South Dakota, Oklahoma, and Louisiana.

Urban states (60 per cent or more city population) show the smallest increase in motor vehicle deaths, 1.4 per cent, from 1930 to 1931. Rural states (60 per cent or more rural population) show an increase of 1.6 per cent, whereas states between these extremes show the largest increase, 2.2 per cent.

The seriousness of the motor vehicle accident problem is emphasized by comparison with homicides and suicides. The latest available figures show that more than three times as many persons are killed by motor vehicles as meet death at the hands of criminals. This difference has developed during the past decade; the homicide rate has increased from 7.1 to 8.4 deaths per 100,000 population since 1920, whereas the motor vehicle death rate increased from 11.8 to 25.7—118 per cent.

Detailed information on 1930 accidental deaths indicates that school children are continuing the outstanding progress in safety that has been going on since 1924. The accidental death rate for persons of all ages increased from 69.6 in 1922 to 80.6 in 1930, an advance of 16 per cent. Among children between the ages of 5 and 14, however, the death rate was only 36.03 in 1930 compared with 40.08 in 1922, a decline of 11 per cent. The rate for children under 5 declined 5 per cent in the same period. The contrast is even more striking for deaths from automobile accidents. This rate for persons

of all ages advanced 98 per cent during this time while the rate for school children advanced only 4 per cent. For children under 5 there was an increase of 45 per cent.

Of the 30,000 deaths in homes in 1930, nearly 12,000 are charged to falls, and of these 8,000 were among persons 65 years of age or over. Burns and scalds are about half as important as falls, and the deaths from this cause are concentrated at the earlier ages, nearly one-half of all deaths occurring among children under 15.

The death rate from drowning in 1910 was 9.0 and reached a maximum of 10.2 in 1913. It then dropped to a low rate of 5.7 in 1920 and has since fluctuated considerably, the 1930 rate being 6.1. Firearms also cause a fair share of the public accidental deaths. The greatest hazards are to young men, about one-third of the annual total occurring in the age group 10 to 19 and another 20 per cent in the age group 20 to 29.

Deaths in aviation accidents increased to a new high total of 620 in 1930. Final Bureau figures are not yet available for 1931, but there is every indication that there was a decrease last year. In civil aviation accidents only, as reported by the Aeronautics Branch of the U. S. Department of Commerce, there was a decline from 529 deaths in 1930 to 439 in 1931. If a similar decline occurs for all aviation, the deaths will number slightly more than 500. On the basis of miles flown, scheduled air transport operations continue to show much greater safety than miscellaneous flying.—R. L. Forney, Accident Deaths Drop 2,000 in 1931, *National Safety News*, 26:34-38 (July), 1932.

**Preliminary Report on Marriage and Divorce for the United States, 1931**—The U. S. Bureau of the Census announces that, according to the returns received, there were 1,060,095 marriages performed in the United

States during the year 1931, as compared with 1,128,572 in 1930. These figures represent a decrease of 68,477 or 6.1 per cent. There was a decrease of 8.4 per cent from 1929 to 1930. During the year 1931, there were 183,695 divorces granted in the United States, as compared with 191,591 in 1930, representing a decrease of 7,896 or 4.1 per cent, as against a decrease of 4.9 per cent from 1929 to 1930. There were 4,338 marriages annulled in 1931, as compared with 4,370 in 1930.

The estimated population of continental United States on July 1, 1931, was 124,070,000, and on July 1, 1930, 123,191,000. On the basis of these estimates, the number of marriages per 1,000 of the population was 8.5 in 1931, as against 9.2 in 1930; and the number of divorces per 1,000 of the population was 1.49 in 1931, as against 1.56 in 1930.

While the net decrease in the number of marriages performed in the country as a whole was 6.1 per cent, the relative change in the different states ranged from a decrease of 49.7 per cent in Idaho to an increase of 25.1 per cent in Nevada.

Only 11 states reported increased marriage rates with percentages as follows—New Hampshire 7.6, South Dakota 7.8, Nebraska 7.6, Maryland 0.5, Virginia 6, West Virginia 2.4, South Carolina 1.5, Florida 1.1, Kentucky 9.7, Utah 1.6, and Nevada 25.1.

Of these, 8 adjoin states in which recent changes made in the marriage laws, require from 3 to 5 days to elapse between the application for a marriage license and the issuance of the same. South Dakota adjoins Iowa, change effective July 1, 1931; Minnesota, April 29, 1931; and Wyoming, June 1, 1931. Nebraska also adjoins Iowa and Wyoming. Virginia and South Carolina border North Carolina and Tennessee where restrictions became effective July 1, 1929. West Virginia is a neighbor to

Ohio where the change became effective July 23, 1931. Kentucky adjoins both Ohio and Tennessee. Utah borders Colorado, change effective September 1, 1931; Idaho, March 16, 1931, and Wyoming; while Nevada adjoins Idaho and California, where the change was made July 29, 1927. Of the remaining 3 states, Maryland has long been a Gretna Green for adjoining Delaware where restrictions have been in effect for some years and Florida borders Georgia where restrictions are in effect for persons under 21 years of age. New Hampshire, however, not only adjoins states where the 5 day interval must elapse but carries the same law on its statutes.

The changes in the various states as regards the number of divorces in 1931 as compared with the year 1930, ranged from a decrease of 26.4 per cent in Mississippi to an increase of 101.6 per cent in Nevada. Increased rates for divorces were reported in 11 other states, New Hampshire, Connecticut, New York, New Jersey, Wisconsin, North Dakota, South Dakota, Georgia, Kentucky, Wyoming, and Utah. The number of divorces granted in the District of Columbia more than doubled, due to increased court facilities. The rate was not computed, however, as the number reported for 1930 was less than 100.

In 1931, for the United States as a whole, 5.8 marriages for each divorce were reported, as against 5.9 in 1930. The District of Columbia and New York State, each having but one cause for absolute divorce, reported 24.7 and 22.4 marriages to each divorce, respectively, while the rates in the states ranged from 12.1 marriages to each divorce in Georgia to 1.5 marriages to each divorce in Nevada.—Dept. of Commerce, Bureau of the Census, Press Summary (July 18), 1932.

**Cancer in Australia**—The report of the Second Australian Cancer Confer-

ence held at Canberra in March, 1931, gives some details of the history and epidemiology of cancer in Australia which are not without interest. The total mortality from cancer in the Commonwealth has risen steadily from 34 in 1879 to 98 in 1929. In New South Wales, Victoria, and South Australia, statistics going back to 1859 are available. In 1859 the rates for the three countries were 14, 10, 10, respectively. There was a great jump in the next 10 years to 25, 27, 15 and in 1929 the rates had reached 95, 107, 109. In Western Australia the rate has risen from 4 in 1869 to 92 in 1929.

In the 19th century cancer was less common in Australia than it was in Europe, and it is still less common, though its acceleration has been more rapid and probably by the end of next year the Australian rate will be little if any below that of Britain, viz., 147. During the 10 years 1920–1929 the Commonwealth rate has increased from 84 to 98, not quite regularly. During this period no alteration of certification has taken place, nor has significant improvement of diagnosis occurred. On the other hand, treatment has improved, so that the incidence rate (which is unknown) must have increased more rapidly than the mortality rate.

In some sites, cancer has declined both absolutely and relatively to other sites. Cancer of the tongue in males is falling; in females it is increasing, but it is still so uncommon in the fair sex that even a continent cannot give a significant figure. Cancer of the womb is rising, but less rapidly than in other sites. Cancer of the anus and rectum doubled in males and increased 60 per cent in females between 1908 and 1929, while the disease in the whole digestive tract has risen from 25.2 to 51.4 in males and from 20.1 to 34.3 in females during the same period. Mortality from cancer of the skin is stationary as it is everywhere; probably incidence has increased

but treatment has improved to balance it.

Research in cancer is proceeding in Australia as it is elsewhere and much upon the same lines and with the same results. Experimental work on cancer is characterized not by failure but by confusions. Australian figures show that though "carcinoma" (including

scirrhus) has increased in rate from 26.1 in 1908 to 69.5 in 1929, the rates for epithelioma, rodent ulcer, and sarcoma have remained constant. The whole increase in cancer in all sites in all countries is in "glandular" cancer—other forms of malignant disease have shown no change in incidence.—*Med. Off.*, 48:3 (July 2), 1932.

## PUBLIC HEALTH ENGINEERING

### REFUSE DISPOSAL IN THE CITY OF VIENNA

E. A. SWEET

*Medical Director, U. S. Public Health Service, Ellis Island, N. Y.*

THE collection and disposal of refuse naturally bear a certain relation to health conditions. While in most American cities the care of garbage and other house refuse is now ordinarily under the control of a branch of the city government separate from the health department, or is let out to private contractors, nevertheless the health officer is frequently called upon to express an opinion regarding particular measures advocated, and in some instances at least must actually supervise work along this line. For these reasons, therefore, he should be acquainted with the various aspects of the refuse disposal problem.

In general it may be said that European cities have progressed further in the handling of refuse than American communities. Perhaps one should also add that refuse is less a problem in Europe than in America, there being a number of reasons for this.

First, the fuel consumption per person is higher with us than in Europe, with a corresponding increase in the output of ashes. Second, we are more wasteful than our cousins across the

water, the European housewife being horrified when she inspects an American garbage can. Third, such rubbish as newspapers, discarded magazines, tin cans, and the like, in America exceeds by far the amount of similar material in an average European city.

In 1928 the city of Vienna completed the introduction of a system of garbage collection which has many advantages over the haphazard methods which often prevail. Prior to this time the refuse was collected in open wagons, the driver announcing his arrival by the sounding of a gong, whereupon the respective maids of the various tenants rushed to the street carrying containers of one sort or another for emptying. At its best the old system was more or less unsightly, resulted in disagreeable odors, and disseminated the maximum amount of dust. Before introducing the present system the situation was carefully investigated in order to avoid mistakes and to determine what appeared most desirable from an economic and sanitary standpoint.

The new method provides for the handling of refuse by the city without

cost to the individual householder. Instead of each household purchasing its own container, of such design as appeared most suitable, the city decided to furnish uniform cans to the various apartments in proportion to the number of residents therein, these to be used in common by the respective families.

imagine. The placing of the units in cellars or basements is naturally avoided on account of the difficulty in handling.

In the new apartments recently erected by the city, housing 2,000 or more, special rooms have been set aside for garbage containers and they are handled expeditiously by means of



TYPE OF CONTAINER IN USE

The choice of location of the garbage cans is determined upon following a conference of the representative of the city with the house administrator or janitor. It is of course desirable that the containers be easily accessible not only to the householder but also to city employees, and that the carrying distance to the sidewalk be relatively short.

Eighty-nine per cent of all receptacles are located either in the garden or the hof, the latter being the central space around which European apartments are usually built. Five per cent are at the entrances, another 5 per cent are either in cellars or other space below the street level, and the remaining 1 per cent are distributed in miscellaneous places. Inasmuch as the cans are seldom if ever unsightly from overflowing or from the scattering of waste, their location in the hof or near the entrance of buildings is less objectionable than one would

electric trucks. The walls of such rooms are tiled, the illumination is adequate, and satisfactory ventilation is secured by means of electric exhausts, so that disagreeable odors are not in evidence.

All cans throughout the city are raised at least 6 inches from the floor or ground level by means of a metal frame of substantial construction built into the wall of the house, the upper handles of the container fitting into corresponding niches in the arms of the frame. The purpose of this elevation is threefold. It enables the householder to maintain a high degree of cleanliness, as the area around and underneath the containers is thus easily swept, and further prevents upsetting with consequent dumping of contents. It also effects a considerable saving by preventing deterioration through the action of snow and rain.

The cans are constructed of somewhat

heavier metal than is customary in America; hence long life with absence of leakage is assured. Reference to the accompanying illustration will show their general character. The two handles on each side, the lower set being placed anterior to the upper, facilitate handling, especially when the receptacles are lifted to the wagons.

The cover is the distinguishing feature of the container. Instead of being removable it is attached to the main body of the can by an arm or radius in such a manner as to slide backwards or forwards by traction on the fifth handle. The cover is so tightly fitted that access of rodents is prevented. Flies are also discouraged from entrance, as the only way they can reach the contents is by crawling through the narrow space between the cover and the side. However, the body of the container is ribbed at its upper edge, so that this space is considerably narrower than it appears. A small projecting arm on each side enables the can to be suspended to the corresponding unit of the collecting wagon.

No separation of the refuse into its various constituents, ashes, table waste, and papers, is attempted, all going into the same receptacle. Chemicals, fluids, and excessive amounts of animal waste from butcher shops and the like are prohibited.

The collecting part of the system consists of two conveyors or wagons detachable from the hauling unit. While such a train is less easily manipulated, especially in narrow streets, than a single truck, the authorities claim that the motor unit is more frequently out of service through mechanical defects than the trailers, therefore a saving is effected.

Each trailer is equipped with a series of twelve closed receptacles or units, corresponding closely in size with the cans, leading into the main undivided body of the wagon. The can is lifted

from the curb to the most convenient receptacle by two men, is suspended on projecting hooks, and is then tilted. The tilting simultaneously retracts the cover to the can and pushes back the cover of the receptacle, so that the contents are emptied without dust, unsightliness, or other objectionable feature, the entire procedure occupying only a few seconds.

The collecting wagons have a personnel of 5, not including the driver. Two men precede the trucks and bring the containers to the curb, 2 men attend to the emptying, and the 5th, equipped with a hooked strap hung over the shoulders, returns the cans, two at a time, to the racks. In this manner neither the filled nor empty containers remain for any considerable period on the street.

On financial grounds, collection is only possible once in 10 days. It is realized that this interval is too long and an attempt will be made to shorten the period to 1 week. Hotels and institutions are provided with a shorter service.

The ultimate disposal of the refuse is by dumping at a point within easy reach of the center of the city. Naturally, this method is objectionable, but money has not been available for the erection of incinerators. When the present dump is filled, estimated to require 4 years, the cost of the longer haul will probably exceed the cost of incinerators, therefore incineration will be provided for on economic grounds.

Upon reaching the dump the refuse wagons run upon a trestle and their contents are discharged into smaller cars below, these cars being hauled by a caterpillar tractor to the outer limits of the dump.

Glass, metal and cloth are sorted out, the contractor paying approximately \$7,000 a year for the privilege. On account of smoke, burning is not attempted. Similarly, no effort is made to limit the breeding of flies by cover-

ing with earth, but the usual petroleum compounds are used, especially in years when flies are prevalent. Complaints of insanitary conditions, less perhaps of odors than of flies and rats, are of course received.

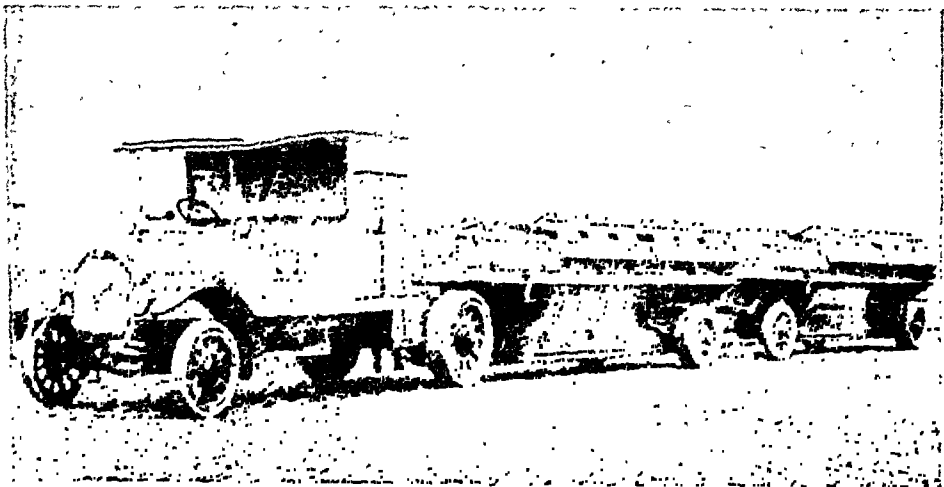
Altogether, the care of refuse in the homes, and the collecting system, are about as satisfactory as one could desire. The standing of boxes, pails and containers filled with rubbish on the sidewalks awaiting collection has been entirely eliminated. There is no dust during the emptying process or when the trucks are driven through the streets, even on windy days. Sometimes a workman will retract the cover to the can to determine if it has been completely emptied, and a small amount of dust will result, but such action is not necessary. The rubbish cannot be seen, which is of course a decided advantage.

The cost has not been excessive. Roughly, Vienna pays \$825,000 an-

nually for this collecting system, which amounts to \$.45 per person. Based upon the number of cans emptied, each of which holds 90 liters, the cost has been \$.13 per unit. In making estimates for the United States the difference in the quantity of refuse must be considered, as well as the price of labor, the average Viennese worker receiving \$11 weekly.

There are approximately 180,000 cans in service, costing \$4.50 each. An increase of from 3 to 5 per cent in the amount of garbage is noted yearly, and the difference between the summer and winter amounts is around 20 per cent. Only 30 of all the receptacles in use have been lost during the past 3 years. A shop where the cans are washed and renovated, is maintained.

The writer knows of no reason why a garbage collection system such as the foregoing, the advantages of which are at once apparent, is not feasible in the average American city.



COLLECTING WAGONS

## INDUSTRIAL HYGIENE

**Compensation for Silicosis in New South Wales—Summary:** The workmen's compensation law of New South Wales is exceptional among the workmen's compensation laws of British dominions in that it contains no schedule of "industrial diseases," but covers injuries by disease in indefinite terms. Under that law, compensable injury includes

. . . a disease which is contracted by the worker in the course of his employment . . . and to which the employment was a contributing factor, but does not include a disease caused by silica dust.

Under this provision, the practice has developed of referring claims for injury by disease to, and for determination by, medical boards or a medical referee. In the fiscal year 1930-1931 there were 165 awards for diseases in comparison with 27,180 awards for accidents. The preceding matter refers to the general law. In addition, under special provisions of law, there have been organized schemes insuring medical benefits and compensation for certain pulmonary diseases to workmen employed in a few specified occupations in several localities.

The *Fifth Annual Report* of the Workmen's Compensation Commission of New South Wales, for the year ending June 30, 1931, gives a significant account of the operation of "Workmen's Compensation (Silicosis) Scheme, No. 1," from its initiation September 16, 1927, to June 30, 1931. This scheme of providing medical benefits and compensation for silicosis, which is publicly administered, covers stone masons, quarrymen, rock choppers, and sewer miners in the County of Cumberland only. Workmen examined during that period numbered 2,231, of whom 113

were suspended upon initial examination; 117 were found to be suffering from silicosis to a dangerous degree; 88 were found to be suffering from it but not to a dangerous degree; 1,899 were found to be free from the disease; and 14 examinations were pending.

The original plan of finance called for contributions from employers of 3 per cent of wages and equal contributions by the State; but the State has been backward about paying up. Assuming that the employers and the State both contribute in full, it is estimated in the report that, for the year 1931-1932, a current cost deficit of £7,303 will be incurred, and that, at the end of the year, there would remain outstanding *contingent liabilities of approximately £44,372*. An increase in the rate of employers' contributions to 5 per cent is suggested, but it is intimated that even such increase in contributions would not be adequate without increased help from the State.

The data in this report, just cited, are rather incomplete and somewhat speculative, but they indicate that the cost of compensating for silicosis (which is additional to the cost of compensating for injuries covered by the general compensation law) is running up to nearly 10 per cent of wages. In consequence of this discouraging experience, a movement to extend this scheme of compensating for silicosis to cover all New South Wales has subsided.

The lesson of this seems to be that permanent disablement by silicosis is not a matter for compensation but for the strictest prevention—by frequent medical examinations to eliminate from employment in the occupations subject to such disease all persons predisposed



to pulmonary troubles or manifesting the first symptoms of such troubles.

The only practicable alternative seems to be to condition the right to compensation for disablement by silicosis upon at least 5 years' exposure to the risks of the occupation and upon truthful answers to interrogatories as to previous health and employment, and, then, for the compensation insurance carrier or carriers to insist upon periodical medical examination of employees in occupations exposed to the disease, with a view to the early elimination from the occupation of all workers manifesting the first symptoms of any pulmonary weakness.—*Bull. Assoc. of Casualty & Surety Executives*, No. 30: 6-7 (June), 1932.

E. R. H.

**Dust as an Industrial Hazard—**This is a rapid survey of the various phases of dust as an industrial problem.

The kinds of dust are classified as poisonous and non-poisonous, the latter subdivided into organic and inorganic, or mineral. The mineral subdivision includes (1) non-silica dust such as coal and lime; (2) combined silicates such as clay, talc and feldspar, and (3) silica which may exist as pure silicon dioxide or sand, granite, quartz, and the various kinds of sandstone. There is some difference of opinion as to whether combined silicates and silica can be considered non-poisonous. Evidence would in recent years attribute its harmful influence to chemical properties.

There is a brief discussion on what happens to inspired dust (with an accompanying sketch of lung cell in relation to blood and lymph vessels). The findings of Mavrogordato, Collis, and Heffernan are cited. Asbestos is also referred to.

The chief discussion concerns silicosis in respect to four important points: (1) particle size; (2) number of particles per cu. ft. of air; (3) mineral composition of the dust; and (4) the

length of exposure. As a general statement, if the silica content of any given dust is 35 per cent, the standard of safety can be placed at approximately 15 millions particles per cu. ft. of air in the breathing zone of the workmen. If the dust has a silica content of 70 per cent, the margin of safety will be approximately  $7\frac{1}{2}$  million particles. At 90 to 100 per cent of free silica, as in the case of sand blasting, the standard is placed at approximately 6 million particles.

Methods of protection, legislation in certain Canadian provinces and the fact that 6 states in the United States cover silicosis (in compensation matters) are pointed out. These states are California, Connecticut, Maryland, Massachusetts, North Dakota, and Wisconsin. Hawaii is also included.—C. O. Sappington, *Industrial Health Digest*, Natl. Safety Council, 20 North Wacker Drive, Chicago (Mar. and Apr.), 1932.

E. R. H.

**Department of Industrial Hygiene—**Dr. Mavrogordato states that investigations were carried out in association with a Joint Committee of the Mines Department and the Chamber of Mines that has been attempting to work out improvements in the method of estimating air-borne dust as at present in use on the gold mines of the Witwatersrand.

The gravimetric method as at present used does not deal with a sufficient volume of air to meet existing conditions, while the konimetric method is unsatisfactory because total air-borne dust and air-borne phthisis-producing or "intractable" dusts vary independently. Methods have been devised for so treating the konimeter-spot that dust, other than "intractable" dust, is eliminated. Several preliminary reports have been submitted.

At the International Silicosis Conference held during the year at Johannesburg, it was agreed that none of the

existing methods of estimating air-borne dust met present-day needs, and South African workers were invited to devise a method of dust-estimation that could be standardized for general use. This investigation will shortly be in hand.—*Ann. Rep. South African Institute for Medical Research, for the year ended December 31, 1930, Johannesburg (1931)*, pp. 24–25. E. R. H.

**Investigation of Air Outlets in Class Room Ventilation**—In this study the air passing out of school room ventilation outlets was determined. It was found to be 55 per cent of the computed value for buildings of comparatively poor design from the viewpoint of air leakage and 75 per cent in buildings of good construction. The study of window ventilation showed an inflow on both windward and leeward sides ranging from 200 to 500' per minute.—G. L. Larson, D. W. Nelson, and R. W. Kubasta—*Heating, Piping & Air Conditioning*, 4, 7: 509–515 (July), 1932. L. G.

**The Health of the Industrial Worker**—This paper is from the viewpoint of disease compensation.

Modern industry has conferred benefits on the human race, whether estimated by improvement in health, or by increase in population. Nevertheless, occupational hazards exist, which determine the occurrence of various kinds of incapacity; for these occurrences compensation is awarded. They weigh heavily upon some industries, foremost among which stands coal mining. Here miners, who only comprise 12.5 per cent of insured persons, account for 42 per cent of claims for accidents, and for 86 per cent of claims for diseases; while 23 per cent of these miners claimed compensation in some form in 1929.

Among diseases not peculiar to the province of coal-mining, inflammations of the skin and skin-cancers are calling

for increasing notice, and pointing to the way in which cancers originate.

The dust-disease, silicosis, which is dealt with separately under the Compensation Act, is likely to be found the most serious of all occupational diseases when reliable records have been amassed.—Edgar L. Collis, University of Wales, *J. State Med.*, 40, 2:96–105 (Feb.), 1932. E. R. H.

**Hygienic Instructions for Working Men**—These instructions cover many special situations in industry and refer to food, water drinking, clothing, fresh air, recreation, bathing and personal hygiene, sleep, care of teeth, constipation, colds, and headache.—May R. Mayers, *Indus. Bull., New York Dept. of Labor*, 11, 7:225–226 (Apr.), 1932. E. R. H.

**The Program of the Department of Labor and Industry for the Prevention of Industrial Disease**—Among features discussed are the following measures adopted by the Industrial Board as of April 15, 1932:

All dust, fumes, vapors, gases, fibres, fogs, mists, or any other atmospheric impurities that, in connection with any process of manufacture or use, are created in, emitted into, or disseminated through areas where persons are employed, in such quantities as in the judgment of the department, would (or might) tend to injure the health of employees, shall be removed by means of suction devices at their point of origin or by other methods acceptable to the department.

When required by the department the employer shall have determinations made of the kind and amount of the atmospheric impurities from a sample taken under conditions and at a point or points indicated by the department. This shall be performed by an analyst qualified for the purpose.

The quantity of any impurities as shown by the determinations shall not be of an amount considered by the department to be injurious to the health of the employees.—

Charlotte E. Carr, Labor and Industry, Pennsylvania Dept. of Labor & Industry, 19, 5:1–3 (May), 1932. E. R. H.

**Silicosis**—Mr. Tinker asked the Home Secretary the number of work-people in the coal-mining industry suffering from silicosis during the latest 12 months for which figures were available and the number who received compensation for this disease, giving separate figures for Lancashire. Sir Herbert Samuel replied: "Silicosis is not notifiable and the only figures I can give are those of cases under the Workmen's Compensation Act. The Returns under that Act show that in 1930—which is the last year for which figures are at present available—there were 20 cases in which coal-miners recovered compensation for disablement from silicosis. Information as to the distribution of these cases is not complete, but so far as known, only one of them occurred in Lancashire. I may add that I am informed that the Medical Board, which was set up in June last, has not so far issued any certificate in respect of any coal-miner in Lancashire."—*Lancet*, 5671:1019 (May 7), 1932. E. R. H.

**Morbidity and Mortality of South African Miners**—The Report of the Sanitation Department of the South African Central Mining-Rand Mines Group for 1931 contains statistical information comparing health conditions during the period with those of earlier years.

The average number of natives employed was 82,416, as against 79,742 in 1930 and 83,340 in 1929.

The percentage morbidity and mortality rates given for the various diseases include the following: pneumonia, 32.61 per cent of total mortality; typhoid fever, 11.06 per cent of total mortality. Accidents accounted for 56.41 per cent of the total morbidity and 23.25 per cent of the total mortality.

The incidence of pneumonia decreased after the cessation of inoculation against the disease. This confirms an exhaustive account of the negative results of inoculation in pneumonia prevention published in the *Journal of the South African Medical Association* in the course of the year.

The tuberculosis rate fell from 5.12 per 1,000 in 1930 to 4.67 per 1,000 in 1931. There were 385 cases with 75 deaths, or a death rate of 0.91 per 1,000.

A comparison of the rates for miners' phthisis in the last 3 years shows a steady decline in the incidence of this disease. The returns for 1931 are as follows: 0.91 cases per 1,000 and 0.05 deaths per 1,000.—

*Indust. & Labour Inf.*, World Peace Foundation, 30 Mt. Vernon Street, Boston, 42, 3:79-80 (Apr. 18), 1932.

E. R. H.

**The Technic of Experimental Pneumoconiosis**—Author's conclusions:

1. A technic is described for the introduction of dust into the lungs of experimental animals by intratracheal injection.

2. The reaction of the lung to dust introduced by this methods is essentially the same as to dust introduced by inhalation.

3. The results obtained indicate that the direct intratracheal injection of dust into the lungs may advantageously replace the dusting chamber for many purposes for which it has hitherto been considered necessary.—

E. H. Kettle and R. Hilton, *Lancet*, 5675:1190-1192 (with plates) (June 4), 1932. E. R. H.

**Tuberculosis in South African Natives With Special Reference to the Disease Among the Mine Labourers on the Witwatersrand**—This extensive volume is the report of the Tuberculosis Research Committee originally established by the Transvaal Chamber of Mines and later expanded into a Joint Committee by incorporation of representatives of the Union Government.

The chapter headings are: General considerations, anthropological and historical notes on the Bantu Tribes of South Africa; reports on tuberculosis of South African Natives prior to the present inquiry; the principal industries and occupations in which natives are engaged in South Africa; the gold mining industry and health; health services in

the gold mining industry; the tuberculosis of native mine workers on the Rand—with sections on tuberculin tests, tuberculosis in the Native Labour Association's Hospital and in the mine hospitals, incidence and mortality from tuberculosis, pathology and classification of clinical types; tuberculosis survey of the native territories; inferences drawn from the foregoing chapters; and discussion on prophylactic measures now in force or capable of being applied in South Africa.

A summary of the recommendations of the committee is given on pages 297–300. The balance of the volume (pp. 301–429) is devoted to appendixes, carrying tables, charts, and case reports by various authors. The volume is profusely illustrated, including 24 plates, part of which are in colors which depict sections of the lungs and other organs undergoing pathological changes due to silicosis and tuberculosis. The volume is too extensive for further abstracting.—South African Institute for Medical Research, Johannesburg, *Publications*, Vol. 5 (Mar.), 1932. 429 pp. E. R. H.

**Extensions of the Schedule of Industrial Diseases**—This is a report of the Secretary of State by a Departmental Committee on Compensation for Industrial Diseases under Section 43 of the Workmen's Compensation Act, 1925. The matters considered were, poisoning by turpentine, mule spinner's cancer, and dope poisoning.

The committee concluded that no case had been made out for adding poisoning by turpentine to the schedule.

In regard to mule spinner's cancer a definition was agreed upon as follows: "a localized new growth of the skin, papillomatous or keratotic, due to mineral oil," this to be inserted in the first column of the schedule. In regard to the second column, the committee recommended the insertion of the words

"cotton spinning by means of self-acting mules." The person undergoing treatment for such localized new growth shall not be entitled for compensation for more than 14 days, unless the judge, committee, or arbitrator, is satisfied, on the advice of the medical referee, that the worker is still incapacitated for work.

In regard to dope poisoning, the committee concluded that it would not be right on the evidence at present available, to add to the present schedule poisoning by any particular substance used as, or in conjunction with, a solvent for nitro-cellulose or poisoning by such solvents generally. It stated that the occurrence of chronic poisoning by any particular substance so used, other than the substances now separately dealt with in the schedule, had not been established; and to include poisoning by all such substances in general terms would be unfair to manufacturers and others, and would go far beyond what would be necessary for the protection of the workmen.—Home Office, Great Britain, London, 1932. 16 pp. E. R. H.

**Mule Spinners' Cancer Made Compensable in Great Britain**—An order dated April 30, 1932, of the British Secretary of State, provides for the inclusion of new skin growths due to mineral oil in the list of compensable diseases. The order applies to workmen engaged as "minders" of self-acting spinning mules.—*Month. Labor Rev.*, 35, 1: 93 (July), 1932. L. G.

**Hospital and Institution Fires**—This is a record of 202 hospital and institution fires with a detailed discussion of the major ones which have occurred since 1918 with illustrations and discussions. There is particular space given to fires from X-ray films.—National Fire Protection Association, 60 Batterymarch St., Boston, Mass., Nov., 1931, 66 pp. E. R. H.

## FOOD AND NUTRITION

**Milk Irradiated by the Carbon Arc Lamp**—Fluid milk was irradiated with a flaming carbon arc lamp using a C carbon. Three and one-half million ergs were applied per c.c. of milk for 16 seconds, between 2,000 and 3,000 Angström units. Most of the vitamin D potency is reached in the first few minutes of irradiation.

The investigation was conducted with children similar to the case of the yeast milk experiments of 1931 (*J. A. M. A.* 97:370, Aug. 8, 1931). Over 100 babies between 1½ and 6 months of age were selected from clinics of the Department of Health of New York.

Infants were weighed regularly and frequent roentgenograms of the wrists taken. Through the period from the beginning of January to the end of March, the babies took 24–30 ounces of milk daily, supplemented in the older groups by cereals and vegetables. Many of the infants were negroes, and Puerto Ricans.

Of the 36 babies which had no evidence of rickets in January, all but one failed to show roentgenologic signs of rickets at the end of the trial; the exception was a premature baby which is regarded as a type in which rickets cannot be prevented except possibly by the use of excessive amounts of viosterol. In the larger group with rickets, those of the roentographic type were definitely healed within a month or 6 weeks.

In the so-called clinical rickets where satisfactory results were obtained, the criterions of healing were recession of the beading of the ribs, diminution of craniotabes, or intensification of calcification of the epiphyses. Craniotabes often fail to show recession even with fortified cod liver oil, leading to the belief that in this disorder there is an

essential factor aside from lack of vitamin D.

The conclusion is drawn that activated milk is at least as efficacious as the "yeast milk" described in the previous paper. Reference is made to the observations of the varying degree of antirachitic potency between cod liver oil and activated ergosterol. This clinical evidence warrants the conclusion that the activated milk is in the class with "yeast milk" and cod liver oil rather than of viosterol. A quart or less of this milk protects infants from rickets although it contains only 50 units of vitamin D by the standard technic.

The authors discuss the antirachitic agents in 6 classes—(1) irradiated milk, fluid and dry; (2) "yeast milk"; (3) cod liver oil; (4) viosterol; (5) irradiated yeast, and (6) direct ultraviolet irradiation. The antirachitic milk has certain advantages as recent tests have shown that 10,000 to 15,000 times the therapeutic dose could be given young rats without resulting in hypercalcemia. Irradiated milk is inexpensive although probably not available except in urban communities. There is no belief that flash irradiation results in the formation of any harmful products. Milk from cows receiving irradiated yeast is also regarded as valuable. Cod liver oil is valuable and may possess a factor not yet recognized but objection to its use is general on account of the taste and odor.

The most powerful of antirachitics is viosterol which it is believed should be reserved for cases resistant to other methods and applicable in communities where irradiated milk or "yeast milk" is not available.

The question as to whether there is

danger in multiplication of foods fortified by antirachitic vitamin is discussed, as well as the desirability of adults partaking indiscriminately of such foods. The question is also raised as to whether Federal license and supervision should be required before antirachitic foods are permitted on the market.—A. F. Hess and J. M. Lewis, *J. A. M. A.*, 99:647 (Aug. 20), 1932.

**The Reaction of the Chicken to Irradiated Ergosterol and Irradiated Yeast as Contrasted with the Natural Vitamin D of Fish Liver Oils—**The literature records instances where irradiated ergosterol does not give the same quantitative results for vitamin D as cod liver oil when fed experimental animals.

In these experiments, 2- to 3-day old chicks were used—white Leghorns and Plymouth Rocks—with 15 to 20 birds in each group. The diet was skim milk as a drink with a dry mash of yellow corn containing calcium carbonate and sodium chloride. The ergosterol was incorporated in corn oil. Dry, ground yeast was also fed, having an anti-rachitic potency of 0.5 Steenbock rat units per mg. The cod liver oil contained 13.3 rat units per gm.—the amount of vitamin D which will produce a narrow line of calcium deposit in the radii and ulnae of rachitic rats in a period of 10 days.

Two of the series with cod liver oil and its equivalent as ergosterol showed that from 40 to 120 times as many units of vitamin D in the ergosterol were required to effect calcification as compared to cod liver oil. The yeast was a poor calcifying source requiring 7.5 to 60 per cent cod liver oil equivalence as yeast to produce the same results. This represents an actual consumption of 0.2 and 1.6 per cent respectively of the weight of the dry mash.

The natural source of vitamin D was also investigated in burbot liver oil,

already shown by other workers to contain vitamin D. Thirty-six baby chicks were divided into 3 groups, one on a rachitic ration, another on the same ration plus 1 per cent cod liver oil, and the third with a basal ration plus 1 per cent burbot liver oil. In this series, burbot liver oil was equally efficient per rat units of vitamin D as cod liver oil. In order to determine whether the vitamin D resulting from irradiation was a different substance, irradiated ergosterol was dissolved in cod liver oil to determine whether greater calcification would result than with the cod liver oil alone.

One lot of rachitic birds were given the basal ration plus 2 per cent of cod liver oil having in solution 532,000 rat units of vitamin D as irradiated ergosterol. Another lot was given the same dose of ergosterol in corn oil instead of cod liver oil and a third lot were controls. The irradiated ergosterol represented the equivalent of approximately 40,000 per cent of cod liver oil.

The final weights of the birds on irradiated ergosterol were less than both other controls. There was no change in the ash of the tibiae. The blood serum calcium increased with both solvents and the inorganic phosphorus in the serum reduced.

Another series was run in which the dosage of the irradiated ergosterol was reduced to 100,000 and 250,000 rat units of vitamin D per 100 gm. of the ration. The experiments were conducted for 32 days and similar results were obtained in this series. Loss in body weight compared with initial weights of 250,000 units. No characteristic change in the ash percentage of the tibiae but serum calcium was increased and the serum phosphorus decreased.

Further experiments were undertaken on the curative effect of ergosterol with small amounts of cod liver oil. The ergosterol was equivalent in vitamin D

units to 1 per cent of cod liver oil and was fed with 2 cod liver oil levels—namely, 0.05 and 0.10 per cent, these amounts of cod liver oil having little or practically no effect on calcification.

The irradiated ergosterol in this experiment had absolutely no effect on calcification, while 1 per cent of cod liver oil was very effective. Typical symptoms of toxicity were found with the irradiated ergosterol in excessive doses, manifested by anorexia, loss in body weight, and in the loss of weight in the dry organs. The administration of carotene had no effect on the antirachitic activity of irradiated ergosterol.—H. Steenbock and S. W. F. Kletzien, *J. Biol. Chem.*, 97:249 (July), 1932.

**The Effect of Oral Administration of Amino Acids and Intraperitoneal Injection of Various Elements and Hydrochloric Acid on Regeneration of Hemoglobin**—The literature contains conflicting statements as to the necessity for supplementing iron with copper in hemoglobin regeneration. Investigators also state that other elements than copper as well as amino acids may have this effect. This experiment was designed to study the effect of amino acids, iron alone, iron supplemented with other elements and, if possible, the amount of copper necessary to supplement iron.

Rats were made anemic with milk from Holstein cows, milked in glass containers. Amino acids were purified and the iron freed completely from copper as shown by spectroscopy.

After 1 month on the milk diet, 100 mg. of the different amino acids—tyrosine, tryptophane, glutamic acid, aspartic acid, and arginine—were added plus 0.5 mg. of iron as ferric chloride. No regeneration of hemoglobin resulted with the amino acids. No appreciable difference in effect was noted between 1, 5 and 10 mg. of iron daily.

Animals on a milk diet with added

ferric chloride were given intraperitoneal injections of the following elements: nickel, zinc, germanium, manganese, vanadium, arsenic, titanium, selenium, mercury, rubidium, chromium, and 0.005 mg. copper. Arsenic caused an immediate regeneration but after 3 weeks this was lost and no such initial effect appeared in the other elements. None of these, except copper, prevented anemia. The intraperitoneal injection of ferric chloride, if dissolved in glycerol to avoid irritation, caused an increase in hemoglobin.

The authors are in doubt as to whether under these conditions the iron is utilized to the exclusion of copper or whether the difference between oral and intraperitoneal feeding may be due to absorption of iron. When pure ferric hydroxide was injected intraperitoneally to anemic rats, to which were given 0.05 mg. of copper as copper sulphate daily, the hemoglobin response was satisfactory, although there was no regeneration in the anemic rats fed milk without copper.—H. L. Keil and V. E. Nelson, *J. Biol. Chem.*, 97:115 (July), 1932.

**Carotene and Xanthophyll as Sources of Vitamin A for the Growing Chick**—Xanthophyll and carotene in this experiment were isolated from fresh spinach leaves. The recrystallized xanthophyll had a melting point of  $174^{\circ}$  and the carotene  $172.5^{\circ}$ . These were dissolved in cottonseed oil so that 0.5 c.c. of oil contained the daily dose of pigment which was fed to the chicks with a pipette.

Day old white Leghorn chicks in 9 groups were kept in warmers in a semi-darkened room. The basal ration was white corn, wheat middlings, casein, yeast and salt. Six of the group were for a prophylactic experiment and 3 for curative. In the prophylactic group, comparison was made between the basal ration and this ration with 0.5 c.c. cod liver oil added to the ration with 0.03

mg. carotene and with 0.25 mg. xanthophyll.

In the curative test the carotene was 0.05 mg. and the xanthophyll was slightly decreased. Vitamin D was supplied, except in the cod liver oil group, by direct irradiation. Good growth resulted in all groups to the 4th week when the chicks on the basal ration developed vitamin A deficiency followed shortly by death. Good growth resulted on the cod liver oil supplement with 0.03 mg. carotene. Xanthophyll supplement and the one in which cod liver oil was supplanted with cottonseed oil showed no advantage over the basal ration. In the curative technic, xanthophyll resulted in no gains, but with 0.05 mg. carotene the effect on growth and appearance was remarkable.

The feeding of xanthophyll in these experiments did not increase the yellow pigment in the legs and beaks of the chicks. It was also found that after the chicks reached 7 to 8 weeks 0.03 carotene daily is not sufficient as the sole source of vitamin A.—O. L. Kline, M. O. Schultze and E. B. Hart, *J. Biol. Chem.*, 97:83 (July), 1932.

**Production of Vitamin A by a Species of *Corynebacterium***—Although the literature records the production of vitamin B complex by means of bacteria, there is no conclusive evidence of the synthesis of vitamin A by a number of different strains of various organisms. In this work a species of *Corynebacterium* was grown on a vitamin free medium of dextrose, agar, peptone, and distilled water. Cultures were incubated at room temperature in total darkness.

The rats used were healthy but approached both vitamin A and D deficiency. After definite A deficient symptoms appeared, the rats were divided into lots receiving separately the ration plus 1 drop of cod liver oil per day, one with no supplement, and the

third with a supplement of 1 gm. of dried bacteria. The results of this experiment showed a definite growth in the case of rats on the bacteria supplement. To insure absence of vitamins in the ration control supplements were run on the animals with xerophthalmia.

One lot received no further treatment, the second, cod liver oil, the third, the diet in which casein was replaced by peptone and one-half the dextrin by dextrose, and the fourth, the same as the third but with the cod liver oil. The result showed no appreciable amount of vitamin A in the culture medium. Xerophthalmia was cured and slight weight gains recorded.—C. E. Skinner and M. F. Gunderson, *J. Biol. Chem.*, 97:53 (July), 1932.

**Idiosyncrasy to Viosterol**—Gordon and Lieberman administered irradiated ergosterol in the form of viosterol (100 D and 250 D) in doses of 1 to 9 drops a day to 200 infants, who were observed over a period of from 6 months to 1 year. Untoward symptoms were noted in 15 in the following order of frequency: diarrhea, vomiting, loss of appetite, colic and stationary or loss of weight.

No case was included in this group unless a definite sequence was obtained, consisting of administration of the drug, appearance of ill effects, subsidence of the latter on suspension of the drug and finally reappearance on the resumption of viosterol.

From their study the authors conclude that a definite pharmacologic idiosyncrasy to minute amounts of irradiated ergosterol (viosterol 250 D) exists in some infants. According to the incidence found in their series, this is of more frequent occurrence than the literature indicates. The drug should be suspended on the appearance of any ill effects and permanently discontinued in the event of reappearance of symptoms on its resumption. The idiosyn-



crazy to viosterol may not be permanent. The possibility of an idiosyncrasy should in no way detract from the general use of viosterol in either the prophylactic

or the therapeutic treatment of rickets. —*Am. J. M. Sc.*, 183 (June), 1932. *Abstr., J. A. M. A.*, 99:684 (Aug. 20), 1932.

## CHILD HYGIENE

### ORAL HYGIENE

ORAL hygiene is assuming more and more importance in the child hygiene program. It is increasingly evident that, in order to make any perceptible impression on dental caries in our school population, mouth hygiene must begin prior to school entrance. After the children have entered school, extraction and filling of cavities make up the bulk of the dental work.

The relation of nutrition to oral hygiene has received considerable attention in recent years. There appears to be very little doubt that proper nutrition of the pregnant mother and of the child in its early years conditions, to a large extent, the outcome of the teeth. Undoubtedly certain hereditary factors play a part, but these may be modified considerably by nutrition, freedom from infectious diseases, and other environmental factors.

Reorganization of dental facilities is now under way in a number of places to meet the needs of both the preschool and the school child. The economic as well as the technical problems connected with oral hygiene must receive serious attention. The Odontological Society of Western Pennsylvania is attempting to solve the problem in Pittsburgh with a minimum expenditure on the part of the community.

This society has established fourteen emergency dental clinics in the western part of Pennsylvania, concentrating services on the 6-year molar and deciduous teeth and using only temporary filling materials. In the clinic in Pittsburgh it has taken care of 1,266 patients in 4 months' time, at a cost of less

than 9 cents per patient. This has included 1,328 extractions and 1,272 fillings.

How has this been done? Efficient management under the direction of an exceptionally capable secretary has been the keynote of this success. Dr. W. Earle Craig, the secretary, finds time in a busy practice of dentistry to manage the affairs of his society with the same interest and effectiveness he would devote to a private enterprise. His earnest efforts, combined with an ability to obtain coöperation from fellow members, have made his administration a splendid example of good dental society management. He has been ably assisted in this clinic work by a committee consisting of Dr. J. K. Wampler and Dr. Leslie Waddill.

Here are the steps followed in the organization of this clinic. *Oral Hygiene*<sup>1</sup> presents them with the thought that they may be helpful to other societies:

1. A committee of three was appointed to promote and manage the clinic.
2. One hundred and fifty members donate their services. Each operator serves a half day at a time, two being on duty in the morning and two in the afternoon.
3. The local charity organization donates the services of a nurse and attendant.
4. The clinic was furnished in the following manner:
  - a. The leading professional building donated three offices.
  - b. Local dental supply houses loaned the complete equipment.
  - c. The local telephone company installed telephone service at the charity discount rate and the Child Health Council takes care of the bill.
  - d. A local printing concern donated admission and record cards.
  - e. The building donated the plumbing fixtures and service.
  - f. A local towel supply house launders the towels which were donated by members.
  - g. Anesthetic gases were donated and

two of the local exodontists care for difficult cases in their own offices.

h. Dentifrice concerns donated tooth paste and the Oral Hygiene Committee of the society provided toothbrushes.

i. Stationery, signs, etc., donated.

j. Dental materials are provided at cost price.

k. Local newspapers were generous in giving publicity and school authorities have coöperated in investigating needy cases and bringing children to the clinic.

A great deal of good has been done by this clinic in the few months it has operated and this without working a hardship on any one person or concern. The society regards the clinic as a temporary emergency effort during present-day conditions.

The needy must be cared for and if organized dentistry does not do it we can look for outside and perhaps unwelcome intervention.

An unusual and radical method of handling the same problem is being carried out in New Zealand. In the current issue of the *Journal of the American Dental Association*<sup>2</sup> it is pointed out that—

The problem of the dental treatment of school children and their instruction in the principles of dental hygiene is being attacked in various ways in different countries. Here, in the Dominion of New Zealand, the government is developing a system which may, at first sight, shock many of the members of our conservative profession by reason of its unorthodox features, but which, on closer investigation, must, I am sure, appeal to all thinking men and women as providing an essentially sound and logical means of solving the problem.

The main feature of the New Zealand service is that the school children are cared for not by dental surgeons but by a corps of specially trained dental nurses. The government established the school dental service soon after the conclusion of the World War. Indeed, it is probable that the decision of the government to do this was influenced by the fact that, during the war, so many men were rejected for service in the army, either temporarily or permanently, on account of dental defects. The constant representations made by the dental profession of the dominion over a period of some 20 years in favor of establishing a school dental service no doubt also helped to influence the government in its decision to develop such a service.

One of the dominion's leading practitioners who had been in charge of the army dental service during the war was selected to organize and direct the new service. The problem that confronted him was no easy one. Consideration of all circumstances led to the decision to create an entirely new type of operator who, as officers of the department of health, would deal only with children in the schools. As was only to be expected many of the members of the profession were startled by so revolutionary a proposal, and at first many objections were raised.

After many frank and full discussions and the consideration of alternative schemes, this proposal was officially approved by the New Zealand Dental Association as the one best calculated to solve the problem. Indeed, the association has taken a very live interest in the development of the service and has on more than one occasion endorsed it. As with all such services, the ultimate aim is to help to raise the standard of general health of the community by eliminating oral sepsis among the children, by ensuring that they have sound teeth with which to masticate and by teaching them the principles of dental hygiene.

A limited number of student dental nurses are appointed by the government every year. The maximum capacity of the training school is 40. The fact that hundreds of applications are received makes it possible to maintain a high standard in the personnel of the service.

Having completed their training and received their certificates, usually at the hands of the minister of health, the dental nurses are sent out to various parts of the dominion to carry on their work among the school children. It should be mentioned here that the problem of providing for the dental treatment of the school children in New Zealand is rendered difficult by the manner in which the population is distributed, about half being concentrated in the metropolitan and urban areas, and the remainder widely distributed throughout the rural districts, since New Zealand is primarily a farming country.

The principle has been adopted of providing regular and systematic treatment over a period of years to a limited number of children, gradually extending to new districts as a larger staff becomes available from the training school in Wellington. It is found that, working on this basis, one dental nurse can successfully undertake the care of a group of about 650 children, clinics being established at suitable centers where children up to this number can be attended to. In organizing the work, schools and school classes are adopted

as the units in preference to age groups. This makes the organization simpler, as it is so much easier to deal with classes as a whole; and, for all practical purposes, the school classes correspond sufficiently closely with the age groups.

No treatment is undertaken without the written consent of the parents, but this is forthcoming in practically all cases. The only children who are eligible for treatment, in the first instance, that is, for the initial cleaning up of the mouth, are the infant children who are in the preparatory classes, as it is considered essential that treatment begin at as early an age as possible. Whenever circumstances permit, children of preschool age are also accepted in limited numbers. The mouths of these children are made clean and healthy by such fillings, extractions and prophylactic treatments as may be necessary. The nurses interest the children in correct diet and in the use of the toothbrush, and leaflets on these subjects are given to them to take home. Parents are invited to attend on the occasion of the first examination, with the object of enlisting their interest and coöperation. Regular reëxamination is one of the main features of the work, and the organization is based on the principle of reëxamination every 6 months of every child for whom treatment has been undertaken. This, of course, limits the number of children that one officer can deal with, but, on the other hand, the system is pro-

ductive of results which would not be forthcoming if the effort were diffused over larger numbers. The system of reëxamination every 6 months, with, of course, such further treatment as is indicated, is continued as a child passes up through the various grades of a school, until he leaves the fourth standard, which is at the age of 11 or 12. Thus, each child is kept dentally fit for approximately 6 years; after which, parents are urged to see that treatment is continued. Attention is given to dental health education throughout this period. In fact, the treatment itself is regarded as educative.

In carrying out dental treatment on a large scale, a tendency to use the forceps rather freely is sometimes noticeable, and, when dealing with children, this is liable to result in undue sacrifice of deciduous teeth. This tendency is bound to creep in unless the number of patients to each operator is limited. The following figures, based on the statistics of the New Zealand school dental service, show the effect of such limitation of numbers: For every 100 fillings performed, the number of teeth extracted is 37; and of every 100 fillings, 62 are in deciduous teeth.

#### REFERENCES

1. *Oral Hyg.*, Aug., 1932, p. 1504.
2. Saunders, J. L., How New Zealand Cares for the Teeth of Her School Children, *J. Am. Dental Assn.*, 19, 9:1643 (Sept.), 1932.

# PUBLIC HEALTH NURSING\*

New York Offers Social Hygiene Course for Public Health Nurses and Social Workers—Even with the existing inadequate reporting of the venereal diseases the figures show that 1 per cent of the population, or 1,227,000 individuals, are at a specified time under care for syphilis and gonorrhea. These figures do not account for any of the large number of unreported, unrecognized, and untreated cases. Interesting studies published by Dr. Nels Nelson of Massachusetts in 1930 show that over a period of 8 years in 42 states, syphilis exceeded scarlet fever by 35,000 cases, diphtheria by 390,000 cases and in 21 states exceeded tuberculosis by 78,000 cases. There is certainly a challenge to health workers in these figures.

Social Hygiene includes the preventive medicine problems of syphilis and gonococcus infections (popularly known as the venereal diseases); sex character education; activities for the protection of youth from moral hazards, especially those tending toward sex delinquency; measures directed against commercialized prostitution; and other activities designed to preserve and protect the social and physical health of the family.—(*Report of the New York State Health Commission.*)

Social Hygiene is a family problem and as such is the concern of every public health nurse. No one can escape the responsibility and all need the accurate knowledge acquired by study and the practical information supplied through discussion of the application of definite principles to specific case problems.

The New York State Department of Health through its divisions of social hygiene and public health nursing is offering a practical course in social hygiene to the public health nurses of the state. Beginning in October, monthly conferences or discussion

groups will be held in about 30 cities over the state.

The course will consist of assigned readings for each month requiring about 3 hours, the theoretical solution of actual problems dealing with cases or situations requiring another 3 hours' preparation for the 2-hour monthly conference.

Even in the three lessons on syphilis, congenital syphilis and gonorrhea, the case study method is used rather than the academic method of just learning facts.

The two lessons on sex education will be very interesting, as there are such wide differences of viewpoint on this subject, and these conferences are certain to be very lively.

Courses of study in child hygiene and mental hygiene are being planned for the next two years.

While every effort is being made by public health officials to maintain adequate public health nursing service, staffs are being reduced in many places. It behooves every public health nurse to make herself indispensable to her community and organization if she hopes to retain her job when curtailment is the order of the day. There is no better job insurance than continuous education which gives one a deeper understanding of family and community needs. At no time in the history of nursing has there been a more urgent need for well informed nurses. The problems in almost every home are more serious and more numerous than under usual circumstances, and require a resourcefulness only to be found in well informed workers. Public health nurses need the inspiration derived from study and from the discussion of mutual problems more than ever before, as their daily contacts with depressing situations strain their physical, mental and spiritual resources to the limit.

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Department Offers Course for Public Health Nursing, *Health News*, New York State Dept. of Health, IX:32 (Aug. 8), 1932.

V. A. J.

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

**A Famous School to Close**—The last class of probationers has been admitted to the New York City Hospital School of Nursing. An order signed by Dr. J. G. William Greeff, Commissioner of the Department of Hospitals, New York City, closes the school to further students.

The reasoning of the Commissioner is clear. More graduates were not needed, for New York has many unemployed graduate nurses. The lack of some of the acute services so necessary to the proper training of students necessitated sending the students to other schools for affiliation for a full half of their 3-year course. Careful study revealed the fact that a graduate staff for the acute wards and an attendant service for the chronic wards would be more economical than the student service burdened with the heavy load of affiliations.

This school, guided by nurses noted for their leadership, has an alumnae association adorned with illustrious names. "A pioneer in its inception, it is equally a pioneer in its manner of closing, for again it is responding to the impetus of a social vision of no mean order."—*A Famous School to Close, Am. J. Nurs., XXXII, 8:871 (Aug.), 1932.*

V. A. J.

**A California County Health Officer Pleads for Public Health Nursing in the Schools**—In a letter to the San Luis Obispo City School Board, Dr. Allen F. Gillihan, County Health Officer, pleads so logically and convincingly for public health nurses and health development work in the public schools, that it may be an inspiration to other health workers who are facing a similar situation. It follows in part:

It has just been brought to my attention that you are considering the discontinuance of the health development work in the city schools of San Luis Obispo, and, as your health officer, I am addressing you in order to lay calmly before you the vital importance of such work in modern education.

The work in education of the past few

centuries has well proved that a child can neither grasp nor retain instruction unless he is in normal condition; that is, unless his brain is able to function naturally. . . . It would be equally as foolish to use the modern high-pressure expensive methods of education on an undernourished child as it would be to punish him for inattention. Such efforts would be as futile as an attempt to fill a reservoir when the water escaped through leaks almost as quickly as the high-pressure engineering method endeavored to fill it.

By the state school law, school budgets must be based upon the average daily attendance of the previous year. It would seem only reasonable in order to keep attendance up to the mark that very close attention be given to reducing the number of absentees and repeaters as much as possible. Cursory examination into causes of absentees from school, and repeaters in school work, would show that sickness is the most frequent actual cause, as well as a most threadbare excuse; so naturally endeavor should be made to keep sickness down.

Modern higher technical education provides for the training of public health nurses, and the State Department of Education tests the training and ability of each applicant before allowing her to do health and development work in the schools. Although it may at times be difficult to secure a suitable nurse, still there is no lack of competent workers in this field.

Your department must now have available records of the city schools for a number of years. If you will have a tabulation made from these records showing the proportion of absentees each year, your work would quickly show the value of such a nurse in keeping up the average daily attendance on which to calculate the budget for the next year. . . .

The work of public health nurses should at all times be supervised and directed by a person having training, experience, and knowledge of relative values in public health; the results of the nurse's work should be evaluated by the same standards. . . .

The financial depression that is now sweeping the country has resulted in much unemployment. That this will result in undernourishment of your younger school children is but natural. Undernourishment in young school children means poor school work and many repeaters at the end of the school term. This wastage of much money could have been saved by searching out and correcting undernourishment tendencies at its very beginning. In some parts of the United States school nursing service has been discontinued after

having been established for several years, and even at this early date the folly of such action has been demonstrated. In the June *Survey* an article by John K. and Margaret A. Norton on What is Happening in the Schools, says:

"In the State of Washington many counties have given up their school nursing service. That this is a dangerous economy was shown by the increased sickness among school children."

The California State school law places the responsibility for the control of communicable diseases in the school directly on the shoulders of the school board.

In the event of an epidemic being introduced into a school, it should be found that the school authorities had neglected to protect themselves under the State Regulation, the responsibility would be theirs.

. . . The efficient and well trained school nurse, by requiring that every absentee from school must pass through her hands before being allowed to return to school, can effectually block such an outbreak. Furthermore, she could find a child with defective vision, secure glasses for him and feel satisfied when she ascertains that his school work promptly improves and the threatened unsatisfactory school work is prevented, and school money is saved from having to be spent on repeating a year's work. Undernourishment could be discovered at its very onset, the cause searched

out and corrected. . . . In all sincerity I must say that it is not in a spirit of antagonism that I am warning your board of this unwise and dangerous economy of discontinuing your health and development work, but entirely from an honest desire to help you. . . .

Health of School Child Comes First,  
*Weekly Bull.*, California State Dept. of  
Public Health, XI, 26:101-103 (July),  
1932.  
V. A. J.

Canadian Nurse Given Opportunity to Study Abroad—In recognition of the comprehensive program of maternal welfare carried on by the Victorian Order of Nurses for Canada, the Rockefeller Foundation has extended to Elizabeth Smellie, its Chief Superintendent, an invitation to visit a number of European countries within the next few months for the purpose of observing and studying conditions of maternal welfare there.

Miss Smellie was to sail from New York early in September, visiting among other countries, England, Denmark, Austria, Germany, and Italy, returning to Canada about the middle of December.  
DOROTHY M. PERCEY

## EDUCATION AND PUBLICITY\*

High School Radio Speaking Contest—Senior high schools in Westchester County, N. Y., participated in an 800-word radio speaking contest as part of the 1932 Early Diagnosis Campaign program of the Health Education Committee, Westchester Tuberculosis and Public Health Association. James A. Tobey, Dr.P.H., Chairman; Ethel M. Hendriksen, Director of Health Education. In Yonkers the same plan

was featured by the Yonkers Tuberculosis and Health Association.

Fifteen senior high schools, one-third of the number invited, were represented on the radio program. Nine boys and 6 girls gave 5-minute radio talks in 5 programs on consecutive days over Station WCOH, Yonkers. Three talks were featured with two musical numbers intervening, supplied by high school students, making up half-hour programs.

Two talks judged the most effective were broadcast later over Station WRNY, New York City. The awards

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

consisted of a certificate of merit in two colors, featuring Robert Koch in his laboratory. Each student winning recognition in his own school or appearing over the radio received this certificate especially inscribed and signed. Sample of the certificate will be sent on receipt of 3 cents postage. Westchester Tuberculosis and Public Health Association, 8 Church Street, White Plains, N. Y.

The radio station was so pleased with the feature that the contest will be repeated to aid the Christmas Seal sale.

**Adapting Health Education to Human Beings**—"Our health education," says Dr. Iago Galdston, speaking on "The Psychophysics of Health Education," is based on the assumption that the individual to whom we address ourselves is passive, is in fact "like an empty vessel, biding time until we come to pour into it what quantity of knowledge and wisdom we see fit." Dr. Galdston's thesis is that health education should be based on a recognition of the dynamic nature of the human being.

If I may be permitted a rather crude analogy to make my point clear, the task of the educator appreciating the dynamic nature of his pupil is as that of a batsman facing a pitched ball, in contrast to, say, a billiard player who seeks to pocket a billiard ball. In the case of the billiard player, he has a bat called a cue; he has a stationary billiard ball and a fixed objective. The billiard player is primarily concerned with the setting of his cue, and with the direction of his thrust, knowing that he can count on the ball to remain stationary until he is ready to shoot, knowing also that the pocket will not shift and that his billiard table is smooth and free of obstacles.

The batsman, however, is part of a dynamic system. The ball he must strike at comes to him with a speed of its own, with a curvature and flight which he must take into consideration. There is an important time element in his performance. He must swing his bat with all factors taken into consideration. Failing of this, he will fan the air, or else make an ineffective if not defeating gesture.

Fortunately, for the batsman as for the educator, the momentum of their respective objects is not capricious and not infinitely variable. Pitched balls, as individuals, fall into a definite and determinable set of categories. And, dropping our analogy, we know that the momentum and progress of the individual's life follow a pattern which is common to the average being.

The quotation is from a paper delivered at the meeting of the National Tuberculosis Association June 7, 1932, and will appear in the association's Transactions as well as in "The Nation's Schools."

**Problems in Dramatizing Scientific Material**—In anticipation of the clinic on radio plays scheduled for the American Public Health Association convention, October 24-27, 1932, we review here comments received on the series of radio plays about the "Conquest of Disease" broadcast by the Detroit Department of Health and the Detroit Dairy Council. The series was described in this department in the June, 1932, issue.

The questions raised by the critics are of the sort likely to arise in other experiments with the dramatic method of presenting health information and some advance thinking about them may help to point up the discussion at Washington.

The first comment deals with the relation of dramatic interest to health teaching. One critic finds that the themes of these plays center around events and situations that teach no health lesson.

The theme should involve some measure beneficial to the listener and which he can carry out for himself; I mean, getting vaccinated, having a physical examination, or seeing that his children have a tuberculin test, etc.; or it should develop a feeling of friendship and a desire to aid in the advancement of some existing institution.

To make my points more specific, consider two of the playlets—take the one on Jenner and the one on Yellow Fever. In the one on Jenner the dominant theme is the unpleasant

conditions of Merry England, while for Walter Reed, it is the ingratitude of Congress and the hard boiledness of newspaper men. In all the talks vital matters pertaining to health improvement are definitely subordinated to dramatic emotional appeal from any angle that presents itself.

Opposed to this criticism is the belief that listener interest is in inverse ratio to the amount of propaganda with which a play is loaded; that building a theme around an obvious moral defeats its own end.

A dramatization of public health which stimulates interest in the subject in general provides an opening wedge for getting persons who would otherwise pay no attention to the subject, to listen later to straight talks.

The next point has to do with scientific accuracy and the dramatic form of presentation. In the series under discussion errors of two kinds were noted. The first are historical, such as several wrong dates, credit for medical discoveries attributed to the wrong persons, and fictitious accounts of events supposed to have occurred in the lives of famous physicians. Has the dramatist the right to distort facts in this way in the interest of his plot? The critic thinks not.

The second set of inaccuracies cited relate to disease and its conquests. The critic says:

The world is not all but free of diphtheria. The bite of a mad dog never was a sure fatality. Persons suffering from hydrophobia do not bark like a dog nor mew like a cat nor do they attempt to bite other persons. A mad animal is not insane. Antitoxin does not contain poison. This apparently is a confusion of toxin-antitoxin with diphtheria antitoxin.

Are errors like these inevitable accompaniments of the process of fitting characters and events into a dramatic form of presentation? If so, is the play an unsuitable method for health education? Or can errors expressed in the conversation of characters in a play be condoned on the ground that radio listeners take in so little detail that these mistakes are not impressed on their minds?

Another interesting point raised:

These radio dramas present scientific discoveries as if they were made in a tense, melodramatic atmosphere with inspiration as their dominant fount.

It is important to sound health education, the writer believes, that the public should realize that medical discoveries are of slow growth. The most casual listener to some of these melodramatic plays gets the impression that one man in one big moment discovered how to prevent or cure a disease.

Are the interests of the dramatist and the scientist then incompatible? This last question, perhaps, puts the whole controversy in a nutshell.

A final criticism relates to the advertising feature of the broadcast:

If the continuity finished with a statement that these dramas were sponsored by the Detroit Dairy Council whose business it was to increase milk consumption, I would have no objection, but in each case the milk is dragged in by the hair of the head and tied up to the stirring drama.

The general impression of the commentator just quoted is quite favorable:

In general, I think they are fine. I do not think they are too melodramatic for the purpose intended. . . . I am not one of those who are so afraid of departing a hair's breadth from fact that they are afraid to say anything with a living spark in it. . . . I think the Radiodramas are good because the final effect must be a stimulation of interest in public health procedure on the part of those who would never otherwise know anything whatever about the subject.

Another comment is favorable:

I feel that a real contribution to health education has been made. . . . For the most part it seems to me that the broadcasts are fairly accurate for radio purposes. While there is something of the melodrama in some of these broadcasts . . . to attract and hold attention it was necessary to make them fairly striking.

Dr. Henry F. Vaughan, Health Department, Detroit, has a few more sets of the Radiodramas which can be sent to health workers upon request.



Mary P. Connolly, Director of Health Education of the Detroit Department of Health, to whom the above discussion was submitted, writes:

We have little defense to make of the material presented and we know that some of the criticisms are warranted, especially those which draw attention to such expressions as an "insane animal." These inaccuracies were corrected in the material before it was presented but unfortunately the original copy was used when it was mimeographed.

Relative to the first comment, I should say that I believe it is assumed that drama should not be used for propaganda. If the purpose of drama is to provide a healthful escape from reality, we, as health educators, will not help the cause of mental hygiene by using the drama for propaganda. As to the time element to which reference is made, drama, as we understand it, should deal with character portrayal and not with events arrayed in chronological order.

We know that dramas are crude in spots; on the other hand, we know that many Detroiters learned from them that science has its heroes and a great part of the public knows only of heroes of battle or of sport.

It is quite true that the man who wrote these dramas took liberties with the material given him for their construction, but it will be difficult to find an historical drama of which the same criticism cannot be made.

Perhaps the most significant result of this presentation was the distribution of more than 200,000 pieces of literature, requests which came from listeners. The literature dealt with the selection of an adequate diet on a reduced income and was distributed at a time when most of us were worried about thousands of families who were facing a second winter on a very curtailed income or were receiving public relief. The science of nutrition came to their aid in selecting food for their families.

M. S. R.

Reader's Friend or Foe—Ralph P. Bridgman, Director of the National Council of Parent Education, was the principal speaker at the session of the National Conference of Social Work at Philadelphia at which "Mental Hygiene Literature: Reader's Friend or Foe" was discussed. Mr. Bridgman criticised a lot of the present-day literature giving advice on the raising of children, and

counseled parents to get from their daily experience the understanding and insight needed which cannot be secured from books. He apparently does not think much of most of the mental hygiene books that have come off the presses in recent years. "They are generally written," he said, "in a detached and scientific vein as though parents were another of our national phenomena. Parents are not scientific."

To illustrate his point the speaker quoted from a number of mental hygiene books which are widely distributed. One of these was the statement of George Bernard Shaw that the world needs parents fit for parenthood. Mr. Bridgman further declared that most such books are written by spinsters or unmarried teachers, and he suggested that "perhaps the best mental hygiene literature of the future will be fiction."

Mr. Bridgman's strictures on educational material on mental hygiene were seconded by Dr. Gerald H. J. Pearson, psychiatrist at the Philadelphia Child Guidance Clinic, who said "it is a fetish of the American people that knowledge solves all problems." He said further that "reading books is a kind of soothing syrup taken by those who do not know themselves."

A keynote of the discussion was that we have been rather hard on parents in this matter of teaching them how to bring up their children and that psychiatrists are beginning to change their attitude toward parents. They are beginning to consider them more as human beings, like the rest of us. This point was stressed again and again in Mr. Bridgman's paper, which quoted copiously from many recent books.

Dr. Pearson seemed to disagree with the notion that parents can learn how to train their children by reading books, many of which deal with extreme forms of misconduct in a way that does little if any good to the parents who read them. He compared this with the mis-

take of discussing the later stages of tuberculosis with individuals who are only beginning to show the initial symptoms. Mental hygiene books should not, for example, discuss perversions for the benefit of the average reader. He interpreted the wide popularity of this literature as a phase of civilization, and considered that the prevalence of interest in this literature was due to the desire of people with personal problems to look to such literature for authority as they heretofore looked to the church and tradition.

Mrs. Cecile Pilpel of the American Child Study Association in her discussion of Mr. Bridgman's paper spoke of two types of mental hygiene literature: (1) that addressed to the general reader interested in personality development, and (2) books on parent-child relationships read by church, school, and study groups. She declared that such literature should not be concerned solely with emotional aspects of mental hygiene, and expressed the confidence that a better and more rational, good sense type of literature will emerge in the future.

Miss Christine Robb of the Institute for Child Guidance, New York City, also criticised some of the current mental hygiene literature, illustrating one of her points by referring to the extreme case of a parent who had followed John Watson's books literally, to her detriment and that of her children. She deplored the fact that pseudo-scientists were writing mental hygiene books today because our clinicians and mental hygiene educators were not. She thought that mental hygiene literature was peculiarly dependent upon its manner of presentation for its good or bad results.

Dr. Benjamin C. Gruenberg said that mental hygiene is now in the stage of the discoveries of physical pathology, although we are beginning to emerge from this stage and are thinking in terms of mental hygiene as a way of life.

He spoke of a transition from the negative to the positive side of mental hygiene education. He did not think much of books on how to behave, and spoke of the need of holding from time to time a clinic on mental hygiene books, referring to the present meeting as a good beginning.—Paul O. Komora.

**"Lobby" Sessions**—The Washington program is rich and varied—for the health educator and for health workers in all fields. Equally important will be the "lobby" sessions—the exchange of ideas and experiences with individuals and small groups. "What is on your mind?" "What question do you want answered?" Ask these questions—and give your own as well and the conference will start.

*And bring your questions to Education and Publicity Headquarters. We want to know what they are.*

**Ask for Education About Milk**—Said the report of the Committee on Milk of the Conference of State and Provincial Health Authorities (June 2, 1932):

The local health officers of committees in which any considerable percentage of the market milk is still sold raw are urged to use an educational approach. . . .

Furthermore, the dairy industry, through the agency of such an organization as the National Dairy Council, could with advantage inaugurate a persistent radio program which would combine a campaign for adequate milk consumption with one for the encouragement of the use of pasteurized milk only. If the National Dairy Council or other dairy organization undertakes such a radio program, the U. S. Public Health Service and the various state and city health departments should assist in furnishing the necessary educational material.

The report also outlined educational work with the milk producer, allotting parts of the effort to the health and agricultural departments. In *Public Health Reports*, Washington. Aug. 12, 1932.

## BOOKS AND REPORTS

Towards National Health, or Health and Hygiene in England from Roman to Victorian Times—By J. Anthony Delmege, O.B.E., With a Foreword by Sir Thomas Legge, C.B.E. New York: Macmillan, 1932. 234 pp. Price, \$6.50.

Two unusual books on the history of medicine have appeared during the past year, *Man and Medicine*, by Sigerist, reviewed in our issue of July, and the one whose title heads this review. Unlike as they are in many ways, both go back to fundamentals.

Delmege points out in his preface that the ground he covers has been strangely neglected and he knows of no work which considers it, which seems to be true. He has covered the history of medicine thoroughly though briefly from something like 10,000 B.C. to 1875, when the great Public Health Act was passed. Except for the ancient historical features the history is largely of medicine in England.

Vaughan, in his autobiography, makes the statement that if history were more carefully read there would not be so many alleged discoveries announced. It is interesting, therefore, to find descriptions and see illustrations of terracotta pipes from the Island of Crete dating 3000 to 1800 B.C. These pipes are said to have been beautifully made and finished, fitted with cemented joints and laid on concrete beds.

The Egyptians naturally had evolved a high degree of hygiene, though they were helpless in face of epidemics. Moses had the Egyptian type of education and his ideas were unquestionably founded upon that. The Mosaic laws gave us the first definite legal codes which were enforced upon an entire nation. From this time on the author traces in various nations the develop-

ment of hygiene in the earliest civilizations, describes the sewage disposal of Rome, and the bath houses and baths in Roman countries.

An unpleasant note, though true, shows that the physicians in the great plagues of the 17th century did not live up to the standards which have always marked the medical profession. They fled with the rich to the country and left the poor people to suffer; but here and there stand out those wonderful figures of whom the world must always be proud, such as the vicar of Eyam who stayed by his parish until the plague exhausted itself after 13 months and left only himself and 29 others out of an original 350 inhabitants.

The great reformers, like Howard, Sedgwick, Simon and Southwood Smith, and the great physicians Jenner and Sydenham with many others are mentioned in interesting sketches. Again the truth of what Vaughan said is demonstrated when we read what Howard said about the plague—that cleanliness, fresh air, adequate diet, and separation would save many more lives than the parade of medicines in the apothecary's shop.

The story of the gin drinking craze which lasted for 25 years is also described. One can hardly help wishing that the author had been a little more full in his stories, but it must be said that practically nothing of value has been omitted. We have a most interestingly written story covering a vast length of time.

The book is well illustrated with excellent portraits obtained from authentic sources. The printing and make-up are exceptionally good, though the number of illustrations and their size have compelled the use of a paper which is heavy and glazed. MAZÛCK P. RAVENEL

**Health and Home Nursing**—By George Margaretta Douglas. New York: Putnam, 1932. 383 pp. Price, \$2.50.

In all nursing schools nurses sooner or later study the history of nursing because—

The origin of our various activities, the spirit animating the founder of a profession, and the long struggle toward an ideal as revealed by a search into the past—these vivify and ennoble the most prosaic labors, clarify their relation to all else that humanity is doing, and give to workers an unfailing inspiration in the consciousness of being one part of a great whole.

It is logical and fitting then that high school and college girls studying home nursing as they are doing more and more every year should have this insight into the past also, and perhaps they need it more as they are not apt to have Dock and Stewart's revised *A Short History of Nursing* readily available.

Miss Douglas devotes four chapters of her book to the concern for health among prehistoric people, and those in the ancient and medieval worlds, leading up to health and nursing in the world today. Then she has a fine chapter on the care of the baby and preschool child—laying the foundations of health in the years when most can be done, when there is a chance to prevent a great deal of illness.

The rest of the book is devoted to topics usually treated in books of this kind, such as symptoms of illness, making a comfortable bed, and the like. She gives a little more of the philosophy of home care and gets in a little more of the inspirational side of nursing than usual. The last chapter, which deals with occupational therapy and its effect on mental hygiene, is new.

The Questions and Activities at the end of each chapter are original and thought provoking. There is a full and carefully chosen list of References and

Suggested Readings, also, after each chapter, and a complete Bibliography, an appendix and a good index at the end of the book.

There are a few typographical errors, but the book is attractively printed, well illustrated and simply written—it makes very interesting reading. It is scientifically sound, practical, and up-to-date. It is recommended highly.

EVA F. MACDOUGALL

**Medical Men in the American Revolution 1775-1783.** *The Army Medical Bulletin No. 25*—By Louis C. Duncan, Lieut. Colonel, U. S. Army, Retired. Medical Field Service School, Carlisle Barracks, Pennsylvania, 1931. 414 pp.

In this bulletin Colonel Duncan analyzes and discusses the available official and unofficial data dealing with the medical men and the medical activities of the American Army during the American Revolution. The story is especially well told, interesting, and readable. The author has drawn delightful pen pictures of such noted men as Church, Morgan, Shippen, Rush, and many others. He discusses dispassionately their successes and failures against a background of ever changing political and military conditions.

It appears that typhus was the most prevalent disease among the American troops, and that the intestinal diseases and smallpox also exacted a terrible toll in lives and health. The attempts to control smallpox by inoculation are graphically described. The author estimates from his data that 70,000 men died of disease during the entire period of the war, or an average of 10,000 a year. He also estimates that 10,000 died as the result of battle injuries.

*Medical Men in the American Revolution* is published as a Government bulletin. The text is divided into 25 chapters and 2 appendixes. Explanatory notes and a biography are placed at

the end of each chapter. It is a welcome and very much worthwhile addition to the literature on the history of medicine.

GEORGE C. DUNHAM

**Accidents, Neuroses and Compensation**—By Dr. James H. Huddleson. Foreword by Dr. J. Ramsay Hunt. Baltimore: Williams & Wilkins, 1932. 256 pp. Price, \$4.00.

Because of the advent of Workmen's Compensation Laws and the World War, traumatic neuroses have assumed increasing importance, especially as related to industrial accident work.

This excellent scientific treatise includes a consideration of historical points; etiology; classification and symptomatology; structural pathology; post-traumatic psychoses, psychopathies, and malingering; specificity between situation and syndrome; evolution, duration, and prognosis; differential diagnosis; treatment; compensation; and prophylaxis.

There is an excellent bibliography of approximately 500 international references. A useful feature of the book is a summary at the end of each chapter. Case histories are wisely used to illustrate various principles.

The author has some very definite ideas concerning compensation:

In brief, if the awarding of money for traumatic neuroses cannot be legally and finally abolished, then it should be given in a single sum at the earliest possible moment, in an amount ranging from \$50 to \$500. Actual verdicts in personal injury suits are too tardy in time and too liberal in amount. The postponement of a final cash award destroys its curative properties. Continuous payments possess questionable socio-economic merit and generally less than no therapeutic value.

Regarding prophylaxis, Dr. Huddleson states:

If, as Wechsler says, "a neurosis is the penalty one may pay for growing up," then traumatic neuroses are among the penalties incurred by society through hyperindustrialization and depersonalization. Without being

obliged to alter main trends, civilization is bound to apply correctives. . . . Quick resumption of occupation is strongly prophylactic in the face of sudden fright and little injury. Patients with cerebral injuries must be kept in bed long enough to preclude postconcussion neuroses.

This technical and highly specialized work deserves a place in the library of every industrial physician, where it will eventually prove its usefulness as an important reference volume.

C. O. SAPPINGTON

**Vitamins: A Survey of Present Knowledge.** *Medical Research Council Special Report Series, No. 167.* London: Published by H. M. Stationery Office, 1932. Price, 6s, 6d. net.

In 1931 we had a very complete and excellent review of "The Vitamins" from the Pickett-Thompson Research Laboratory, also the second edition of "The Vitamins," by Sherman and Smith. Now comes the present volume, which is complete and thorough. While the book is vouched for by the Medical Research Council, there is a special Committee upon Accessory Food Factors. The auspices under which this extensive report is issued places it practically beyond criticism.

The book opens with an historical introduction of 14 pages, one of which is given up to charts. We believe this to be the most exact history we have examined, and much needed in view of the claims which have been made by certain persons. Each of the vitamins is then taken up in turn, and an especial chapter is given to "Vitamins and Dental Tissues," which takes in the work done by May Mellanby.

Useful as the story of the vitamins is of itself, for the general reader, the last third, approximately, of the book will be more interesting and of more practical use to the average physician, considering as it does, "Some Nutritional As-

pects of Cow's Milk with Special Reference to Vitamins," "Vitamins and Human Diets," to which 42 pages are given, and "Vitamins in Diet of Mother and Infant." These really treat of the application of our knowledge of the vitamins as given in the first two-thirds of the volume.

The illustrations are abundant and excellent, as are also the tables. Under each vitamin, foodstuffs are listed giving the relative amount of that particular vitamin in them, together with the references from which they are taken. At the end there are 25 pages of references.

Appendix I, Table XXI, gives a list of foodstuffs, requiring 9 pages, with the relative amount which each contains of all of the vitamins, A, D, E, B<sub>1</sub>, B<sub>2</sub>, B, and C. Appendix II gives the report of the Conference on Vitamin Standards, held in London in 1931. There is a good index.

With this book alone, there is no reason for anyone to lack knowledge concerning the accessory food factors. It shows the careful preparation and exactness which has been so characteristic of the publications of the Medical Research Council of England.

MAZÛCK P. RAVENEL

### Manual of Public Health Nursing—

*Prepared by The National Organization for Public Health Nursing. New York: Macmillan (2d ed.), 1932. 253 pp. Price, \$1.50.*

Every public health nurse whether working alone or on a staff should find this *Manual* a safe guide and ready reference. It contains procedures and technics scientifically worked out, and it holds the cream of all the policies, procedures and technic the world over.

The standards set up by N.O.P.H.N. in this book are wide in scope and general in character leaving room for each individual organization to modify them to meet its needs. The material is

rightly divided into two parts, "Organization and Administration," and "Nursing Procedures and Techniques," making it clear in its meaning and easy to refer to.

RUBY ROGERS

**Human Sterilization. The History of the Sexual Sterilization Movement—***By J. H. Landman. New York: Macmillan, 1932. 341 pp. Price, \$4.00.*

Chapter I is concerned with the general eugenics movement and the systems which may be used to restrict the multiplication of socially undesirable individuals. The author believes that since segregation of catogenic individuals has failed to eliminate them from the race, the more effective method of human sterilization of the socially inadequate individuals should be practised.

By means of statistical evidence given in Chapter II, the author acquaints one with the extent and cost of the mentally diseased and incompetent individuals in the United States. The succeeding chapters deal with the problem of human sterilization, including a history of human sterilization in the United States; the legal status of human sterilization laws; types of mentally diseased and mentally deficient people; and the classification of the inheritance of psychotic traits and of mental deficiency. The various types of human sterilization operations are listed, including the relatively new biological method. Possible physiological and mental effects of sterilization are discussed. The legal status of human sterilization operations is treated concisely. In Appendices A to J, statistical data in regard to sterilization statutes, motives for sterilization operations, records, and fees are given.

The author directs attention to the fact that cases of dementia praecox and manic-depressive insanity are most frequent in institutions, and that very few recover. For this reason he considers

it important that therapy and legislation should be concerned first with these cases.

The work can be recommended for its fund of information concerning a controversial question. It is well documented, and must serve a useful purpose.

NEWELL R. ZIEGLER

**Official Proceedings of the 37th Annual Convention of the American Society of Municipal Engineering, Held at Pittsburgh, Pennsylvania, October, 1931—*St. Louis: American Society of Municipal Engineers, 1932.*** 855 pp. Price, \$7.50.

This volume presents in 27 chapters the matters dealt with by municipal engineers, city officials, and others at the 37th Annual Convention in Pittsburgh. Certain chapter headings indicate the types of municipal problems receiving discussion in this 5-day meeting—city planning, air ports, traffic control, municipal financing, paving construction, and maintenance. Of particular interest to sanitary engineers and sanitarians are chapters V, VI, and VII, dealing with water works, refuse disposal, and sewerage and sanitation.

In a paper on taste and odor removal, Baylis calls attention to various methods in use. Among other things he says "So far as is known there is practically no taste producing compound likely to be present in water that cannot be removed by activated carbon." The powdered forms seem to be most satisfactory. D. E. Davis describes several modern zeolite plants in his paper on zeolite in water softening. Detailed cost data are given, particularly on the plant at Sewickley, Pa. In a discussion of lime-soda water softening, Porter deplores the lack of attention to this important problem. He points out that less than 10 per cent of the water supplies in the United States needing hardness removal are softened.

Chapter VI covers refuse disposal and

reviews prevailing tendencies in incineration. Sewerage and sanitation are dealt with in Chapter VII. Specific subjects discussed include sewer maintenance, mechanical handling of sludge, sewage and trade wastes treatment, and lime-chlorine treatment.

E. S. TISDALE

**Diseases of the Coronary Arteries (Myocarditis)—*By Don C. Sutton, M.D., and Harold Lueth, M.D. (Illus.) St. Louis: Mosby, 1932.*** 164 pp. Price, \$5.00.

The authors, with a wide knowledge of the literature and a clear insight into the broad and extensive theoretical aspects of the subject, have made this work one that should be of practical application to the specialist in cardiology, but most particularly to the man in the general practice of medicine.

The book has three outstanding features—the practical nature of the subject matter presented; the clearness of expression, and particularly the distinctive and lucid description of clinical signs and symptoms; and the emphasis that is placed upon the physical signs and symptoms. By students in cardiology and those in the practice of medicine, the work should receive recognition and wide acceptance.

In recent years much emphasis has been placed upon electrocardiography by those writing upon the subject of the various phases of heart disease. The electrocardiograph is an expensive apparatus and one that is available to only a small percentage of those practicing medicine. The authors properly give recognition to this refinement as an aid to diagnosis and prognosis. They also and properly emphasize that even with the electrocardiographic interpretation, reliance for the diagnosis under given conditions must often be placed unhesitatingly upon the clinical diagnosis; that is, physical signs and symptoms. They repeatedly call attention to the dangers

of relying entirely upon an electrocardiographic curve in the diagnosis of either coronary or myocardial disease.

There is one criticism to be offered. In recording the leucocyte count, the authors fail to give the findings that are of the utmost importance—the differential percentages, and an evaluation of the young, or immature forms of the polymorphonuclear neutrophils. The total white cell count, which is the only leucocyte count recorded, is only an index of resistance on the part of the patient to an infection. It is not an index to the presence of an infection. The differential leucocyte count, which is the most reliable guide to the presence of an acute pyogenic infection, should always be recorded wherever the leucocyte picture is under consideration, and with this there should be an evaluation as to the young or immature forms of the polymorphonuclear neutrophils.

M. PINSON NEAL

**Cancer. What Everybody Should Know About It—By James A. Tobey, D.P.H. Introduction by Joseph Colt Bloodgood, M.D., and H. L. Mencken. New York: Knopf, 1932. 313 pp. Price, \$3.00.**

There has long been a need for a popular work on cancer, one in which the style is simple and the subject presented in a manner not too repellent.

For many years the only volume which in any sense met this need was the volume written by an Englishman, Charles P. Childe, entitled "The Control of a Scourge, or How Cancer is Curable." But this book is now out of date in many of its aspects, though it is still valuable because of its breadth of vision and the admirable style in which it is written. It is practically unknown in this country except among those interested in the educational phases of the cancer question.

For us especially a work is needed from the American viewpoint, particu-

larly one giving full information about methods of control employed in America. This the author has accomplished in an exceedingly satisfactory manner, and has used his material well. The interesting records of the past have been introduced, and form an introduction to the whole subject of cancer.

The writer then turns to the occurrence of cancer in famous people, that is, famous people in whom cancer was acknowledged as a cause of death. There are many not on his lists whose death certificates or obituary notices mask under the diagnosis of heart failure or pneumonia the fact that their end was really due to cancer. True, this phase of falsification of death certificates is passing, but there are numerous examples of it still known to every consultant.

The types, locations, diagnosis, and treatment of cancer are then taken up. Obviously, as the writer is not a physician, the medical side is not presented in a highly technical fashion, but sufficient is said to enable people with the more common varieties of cancer to realize their situation and consult a physician, provided they desire to do so. There still remains a strange hesitancy on the part of intelligent individuals to take this step which places upon them the responsibility of accepting an operation or radiation treatment, so long as they can conceal, by some process of mental inhibition, the exact nature of their disease from themselves and from their families, and there are still many who turn up at last in desperate condition, asking for help when no help can be given. Education does little for such people.

On the other hand, there are those whose lives are rendered burdensome by the fear, and usually an unnecessary fear, of the disease. This development of a cancer phobia has resulted in some criticism of the organizations whose object it is to provide public education.



In many instances this criticism is loudest from members of the medical profession, who directly benefit in so far as their ability to cure cancer cases is dependent upon the education which these agencies offer. The members of the medical profession, however, are still too set upon cure, and not upon prevention. They do not realize that these neurotics, if they did not have a cancer phobia, would have some other kind of phobia, and would still throng their offices and ask for a diagnosis. A little kindly interest in such people and a careful physical examination will remove their fears. If the neurosis recurs, another examination will give them a period of mental rest—all this with the very slightest expenditure of time and energy on the part of the physician. It is strange that such a situation exists in these days.

The chapter on treatment leads obviously to the subject of radium and X-rays, and one of the best chapters is that in which the work of Roentgen and of the Curies and their remarkable discoveries are outlined. An excellent warning is given as to the necessity for long and painstaking research which will surely be necessary before an effective general cure may be discovered, and the conditions under which any suggested cure must be studied. Some of the loudly advertised "cures" are treated in detail.

The question of the increase in cancer is intelligently discussed, and a sane position taken on that phase of the cancer question, concerning which it is easy to become emotional.

A most original portion of the book is that discussing quack cures. It should be read by everyone, for every physician knows how prone people are, when they hear that a friend or a relative has cancer, to recommend some extraordinary quack, and place the family physician in an embarrassing situation. If he is unable to cure the patient, why

should not the patient go somewhere, they ask, and take something, often at a high price, which may possibly do some good? The fact that it never has and never will do any good seems to be no deterrent to the lay mind. This problem leads to the discussion of cults, of the method of selecting a good physician, as contrasted with the quack, and finally an excellent review of the rise of the educational movement in cancer in this country and in Europe.

In the last chapter there is a summary in the form of a group of cancer maxims which compresses in a few sentences the essential facts a layman should keep in mind.

The volume is illustrated with an excellent series of charts, many of them drawn from the publications of the American Society for the Control of Cancer, and a useful bibliography is appended for those who wish to read further on the subject. Altogether the volume is well written, excellently printed, and admirably covers the ground which the author intended it to do.

FRANCIS CARTER WOOD

**Report on Chronic Disease in New Jersey—*Department of Institutions and Agencies, Trenton, New Jersey, May, 1932.***

The problem of chronic disease is an especially difficult one. We have before us a report made in accordance with a joint resolution of the New Jersey Legislature in 1931, which gives every evidence of expert study as well as compilation.

It shows that 1 person in every 650 residents—a total of 6,000 to 7,500 chronically ill patients—is under the care of various agencies. There were 14,000 deaths from cancer in 1931. In 1880, only 2.2 per cent of the deaths were due to cancer, but there has been a steady rise to 10 per cent in 1930. Practically the same thing is true of

heart disease, to which 12.2 per cent of all deaths were due in 1920, while in 1930, the percentage had risen to 21.7.

Another point of great interest to all health workers is the shift in the age of those chronically ill, which seems undoubtedly due to public health work, which saves the younger. In 1880, 18.5 per cent of the population in New Jersey were 45 years or over, while 21.1 per cent of the deaths occurred in those 60 or over. In 1930, the percentage for the first group was 23.1, while the death rate in the latter group had risen to 44.1, and the deaths of children under 5, which made up 39.1 per cent of the total

in 1880, had fallen to 12.1 per cent in 1930.

This excellent report considers also the facilities for treating and housing chronic cases, and excellent programs are suggested.

Crippled children come in for due consideration, both as regards causation and subsequent care. Infantile paralysis, as would be expected, stands first as the cause of crippling, with tuberculosis second.

This report can be commended to all health workers as well as to those interested in health conditions.

MAZŮCK P. RAVENEL

## BOOKS RECEIVED

- MENTAL DEFICIENCY DUE TO BIRTH INJURIES.** By Edgar A. Doll, Winthrop M. Phelps and Ruth Taylor Melcher. New York: Macmillan, 1932. 289 pp. Price, \$4.50.
- THE SPUTUM. ITS EXAMINATION AND CLINICAL SIGNIFICANCE.** By Randall Clifford. New York: Macmillan, 1932. 167 pp. Price, \$4.00.
- NURSES ON HORSEBACK.** By Ernest Poole. New York: Macmillan, 1932. 168 pp. Price, \$1.50.
- NEGRO HOUSING.** The President's Conference on Home Building and Home Ownership. Washington, D. C. 1932. 282 pp. Price, \$1.15.
- PRINCIPLES OF CHEMISTRY.** 3d ed. By Joseph H. Roe. St. Louis, Mosby, 1932. 486 pp. Price, \$2.50.
- EMERGENCY WORK RELIEF.** By Joanna C. Colcord, William C. Koplovitz and Russell H. Kurtz. New York: Russell Sage Foundation, 1932. 286 pp. Price, \$1.50.
- PRINCIPLES OF MENTAL DEVELOPMENT.** By Raymond Holt Wheeler and F. Theodore Perkins. New York: Crowell, 1932. 529 pp. Price, \$3.75.
- PREVENTIVE MEDICINE.** 4th ed. By Mark F. Boyd. Philadelphia: Saunders, 1932. 532 pp. Price, \$4.50.
- BACTERIOLOGY AND PATHOLOGY FOR NURSES.** 6th ed. By Jay G. Roberts. Philadelphia: Saunders, 1932. 259 pp. Price, \$2.00.
- YOUR TEETH. THEIR CARE AND PRESERVATION.** By Lewis H. Urling. Philadelphia: Dorrance, 1932. 67 pp. Price, \$1.50.
- LABOR PROBLEMS AND LABOR LEGISLATION.** By John B. Andrews. New York: American Association for Labor Legislation, 1932. 135 pp.
- ENVIRONMENTAL FACTORS IN NEGRO ELEMENTARY EDUCATION.** By Clark Foreman. Chicago: Julius Rosenwald Fund, 1932. 88 pp.
- PRACTICAL MEDICINE YEAR BOOKS—GENERAL MEDICINE, PEDIATRICS AND GENERAL THERAPEUTICS.** Chicago: The Year Book Publishers, 1931 and 1932. General Medicine, 800 pp. Price, \$3.00. Pediatrics, 550 pp. Price, \$2.25. General Therapeutics, 450 pp. Price, \$2.25.
- STUDENT'S HANDBOOK ON NURSING CASE STUDIES.** 2d ed. Deborah MacLurg Jensen. New York: Macmillan, 1932. 129 pp. Price, \$1.25.

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Milk Production Standards**—Committee (State and Provincial Health Authorities) recommendations in reference to the misuse of the term "natural" for raw milk; short-time pasteurization; recombined milk; and other problems of dairy and creamery supervision are published.

ANON. Report of Committee on Milk. Pub. Health Rep. 47, 33:1683 (Aug. 12), 1932.

**Preventing Postvaccinal Encephalitis**—Encephalitis, which occasionally follows vaccination, may be prevented by employing a suitable technic, performing vaccinations in infancy, and preferably after immunization with toxoid. This is a highly important paper.

ARMSTRONG, C. Postvaccination Encephalitis. Pub. Health Rep. 47, 30:1553 (July 22), 1932.

**European Public Health**—As public authorities in Europe lay increasing stress on adequate treatment as a basis for public health, the private practitioner of medicine more and more is drawn into close relation with the government. Where the coöperation is best, the material position of the physician has not suffered.

BOUDREAU, F. G. Relation of Private Medical Practice to Public Health in Europe. J. A. M. A. 99, 9:720 (Aug. 27), 1932.

**British Prenatal Hygiene Practice**—Some of the reasons why antenatal care sometimes fails to prevent mortality are set forth in candid detail. The final conclusion is that much that passes for prenatal care is too irregular, too infrequent, too ill organized and perfunctory to deserve the name, and can never do anything but bring preventive midwifery to ill deserved disrepute. When

the English call a spade a spade, they do it with vengeance.

BROWNE, F. J. Antenatal Care and Maternal Mortality. Lancet 223, 5679:1 (July 2), 1932.

**Child Labor vs. Child Health**—The possibilities in our present economic and industrial conditions for the increase in the employment of children to the detriment of future public health is discussed, as is the need for preventive measures.

DINWIDDIE, C. Child Labor: The Enemy of Child Health. Pub. Health Nurs. 24, 9:461 (Sept.), 1932.

**Variable Streptococci**—Presenting evidence that a streptococcus, a rod-shaped spore producer, and a filterable form are different phases in the life history of the same organism recovered from cases of epidemic encephalitis.

EVANS, A. C. The Metamorphosis of Streptococci into Spore-Bearing Rods and into Filterable Forms. Pub. Health Rep. 47, 34:1723 (Aug. 19), 1932.

**Maternal Mortality**—A questionnaire study of maternal deaths in New York State is reported upon. Less than half the deaths were associated with live births; abortion was a factor in a fifth of all deaths; a third of the patients had previous illnesses which may have affected the outcome. These are some of the findings.

GARDINER, E. M. Maternal Mortality—Outline of Method of Study. Child Health Bull. 8, 5:146 (Sept.), 1932.

**Irradiated Milk**—Despite its failure to measure up in antirachitic units according to the standard rat tests, irradiated milk was found in practice to be highly potent in preventing rickets. This naturally leads to a question of the reliability of accepted tests.

HESS, A. F., and LEWIS, J. M. Milk Irradiated by the Carbon Arc Lamp. J. A. M. A. 99, 8:647 (Aug. 20), 1932.

**State and Local Health Units—**“A state department of health should be prepared to assist county health departments through financial assistance, establishment of standards for personnel, administrative guidance and technical service.” This is the first of several eminently reasonable conclusions ending this worthwhile contribution to administrative practice.

MUSTARD, H. S., and SHARP, W. K., JR. Service of State to Local Health Departments. Pub. Health Rep. 47, 31:1601 (July 29), 1932.

**Pasteurization in England—**In this discussion advocating general pasteurization, the statement is made that, although England lags behind other countries in this matter, in London more than 90 per cent of the milk is pasteurized.

ORR, T. Is Pasteurization the Solution of the Milk Problem? Pub. Health 45, 11:326 (Aug.), 1932.

**High School Health Education—**In Lynn (Mass.) a highly successful health education program was formulated and carried out. This paper has the merit of telling, not what should be done, but what was done and how.

STEPHENS, E. The Three-Year Health Education Study in the Lynn English High School. New Eng. J. Med. 207, 6:263 (Aug. 11), 1932.

**Training Health Educators—**The training in the basic sciences, hygiene and pedagogy that should be required of the school health educator is set forth in convincing detail.

TURNER, C. E. Training for Health Education. Pub. Health Nurs. 24, 9:486 (Sept.), 1932.

**American Public Health—**This brilliant summary of the newer movements in health administration designed for British ears will prove just as worthwhile for home consumption.

WINSLOW, C.-E. A. Current Tendencies in American Public Health. J. Roy. San. Inst. 53, 2:62 (Aug.), 1932.

## NEWS FROM THE FIELD

*It will be appreciated if readers will send to this department such items of news interest concerning public health activities as they consider suitable.*

### 100 YEARS AGO

**A**N ordinance creating a board of health in Trenton, N. J., dated July 3, 1832, was recently found by the city clerk. This was 55 years before local boards of health were required by law in New Jersey. The board appears not to have been appointed for a definite length of time, but one could be appointed in case of need and it could dissolve itself when its work was done. The board was authorized to procure and circulate advice concerning the danger of infectious and contagious diseases and in time of epidemic to “take

such measures as they may deem best calculated to arrest its progress and render its ravages less destructive,” and it was its duty to “make daily reports of progress of the disease and the measures which they have adopted.”

### ATHENS USES ANCIENT AQUEDUCT

**W**HEN Greeks and Romans builded, it was for permanency. The new water works for the City of Athens, constructed under the direction of an American, Richard M. Merriman, of Bethlehem, Pa., includes in its system the ancient Hadrian Aqueduct, a fifteen mile tunnel through the Plains of Attica.

This aqueduct, apparently, was originally constructed during the second

century A.D. It was used for 1200 years, but was then abandoned for some unknown reason. It has now been cleaned and renovated, and through it flows water for the citizens of Athens who for centuries have scrimped along on one and one-half gallons of water a day for all purposes.

The water works themselves, as explained in an article by Oren Arnold in the *Water Works Journal* for April, 1932, occupy the site of the historic Battle of Marathon. Marathon Dam was constructed in 5 years at a cost of \$12,500,000. This, however, was 19 miles from Athens. The Parnes Divide was crossed by an 8-mile tunnel and the Hadrian Aqueduct utilized for the remainder of the distance.

It was necessary to combat malaria constantly during the construction period. Living quarters were doubly screened, stagnant water drained and oiled, and minnows from Italy put into the new lake.—*Health News*, New York State, Aug. 15, 1932.

#### ROAD DUST PREVENTION

**A**MONG recent developments in chemical science, designed to promote public comfort, health, and safety, is the discovery of a better method for the prevention of dust on gravel highways. Every year road dust exacts a large toll in the form of accidents, due to dust clouds at curves, intersections, and other dangerous points.

To correct these conditions, many communities are using a comparatively new method of treatment, known as the calcium chloride treatment. Calcium chloride is supplied for road dust prevention in the form of small white flakes, which when spread over the surface of the road begin immediately to absorb moisture from the air, continuing the process until the surface appears to have had a light rain. Unlike rain, however, this moisture remains for weeks and in some cases months, binding the

loose dust into a moist, smooth, durable surface.—*Public Safety*, 6, 9:14 (Sept.), 1932.

#### PERSONALS

BERNARD C. ROLOFF, formerly Director of Health Education of the Chicago Department of Health, is the new Executive Secretary of the American Mouth Health Association, of Minneapolis.

MAJOR EDGAR ERSKINE HUME, M.D., DR.P.H., F.A.P.H.A., has been appointed Librarian of the Army Medical Library—Surgeon General's Library—of Washington, D. C. This institution, the largest medical library in the world, was founded by Surgeon John S. Billings, who also planned the Johns Hopkins Hospital Library and the New York Public Library, and was President of the American Public Health Association in 1879–1880.

HARRY S. MUSTARD, M.D., F.A.P.H.A., of the Tennessee State Department of Health, has been selected to take charge of the new public health district recently created in Baltimore which was placed in operation on September 15.

DR. VERDO T. WEBB has been appointed Health Officer of Little Rock, Ark., succeeding Dr. Charles R. Moon, who resigned.

DR. WILLIAM T. SHORT, of Stonington, Ill., has been appointed District Health Superintendent of the Illinois State Department of Health. He succeeds Dr. Frank P. Auld, of Shelbyville.

DR. FRANK V. NEWCOMER succeeds the late Dr. Edward M. Boggess, of Elwood, Ind., as member of the Elwood City Board of Health.

DR. THOMAS J. MCKEAN, of Montpelier, was recently appointed to succeed the late Dr. Marion A. Emshwiller as Health Officer of Montpelier, Ind.

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## The Health of the People in a Year of Depression\*

LOUIS I. DUBLIN, Ph.D., F.A.P.H.A., *Life Member*

*Third Vice President and Statistician Metropolitan Life Insurance Company,  
New York, N. Y.*

IT is the duty and pleasure of your retiring President to report first on the state of the Association. We have closed a very successful year. On the first of September, there were 4,742 members and Fellows on our books, representing professional health workers in every state of the union, every province in the Dominion, and the two neighboring republics of Cuba and Mexico, to our south. In spite of hard economic conditions, the like of which none of us can remember, our membership has held up to within 25 of the number on our rolls at the last Annual Meeting when we reached our maximum. We have elected or reinstated 612 members and Fellows during the year, and I am particularly pleased to report that we now have 69 Life Members. I hope this movement which means so much to the Association will continue to grow.

Our finances likewise are in good shape. Our income from membership dues, from the JOURNAL and other publications, and from the Annual Meeting this year can now be safely estimated as in excess of \$71,000. These are the items of fixed income and show a decline of about \$22,000 as compared with last year. Our contingent income which is for surveys, grants from Foundations and others, for specific purposes, has decreased by about \$25,000 this year. Our total income will, therefore, be about \$47,000 less than last year. But to offset that, we have been very careful to cut our expenses and there is every indication that we shall close the calendar year with a small surplus. Most other voluntary organizations, I am sorry to say, are running

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\* Presidential Address delivered before the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

into larger or smaller deficits. Thanks to the excellent management of our Executive Secretary and the guidance of our Treasurer, we have put our resources where they will do the most good. Great credit is due the staff who have accepted serious salary reductions without murmur and have, under conditions which must have been very difficult, carried on their work with all the energy and enthusiasm which have always characterized them and which have made the Association the great force for good that it is.

I report to you also a year of real achievement in the promotion of the public health. The four standing committees of the Association have functioned well under trying conditions. The Committee on Administrative Practice has continued its operations, spreading its gospel of high standards and efficient health service throughout the land. Although the Committee on Fellowship and Membership was very much hampered by lack of financial support, it has, as I have already said, produced a record of which we can be proud. I am particularly pleased to refer to the splendid work of the Committee on Meetings and Publications. You must all of you have been greatly impressed with the extent and character of the program which the committee has prepared. Some 300 papers have been provided, covering every phase of the public health problem and fully 100 of them are by speakers who have never before appeared on our programs. It is in this way that the Association profits from new blood and extends its influence into new areas. The Committee on Research and Standards, in spite of a far-reaching and constructive program of work has, unfortunately, been compelled to go slowly. I wish we could have put larger resources at the disposal of this excellent committee, but the condition of our budget made that impossible. Nevertheless, I am convinced that the four committees are functioning well. Their activities add to the knowledge and practice of good public health work; stimulate the membership to greater achievement; and increase the technical efficiency of all of us.

I cannot, however, leave this subject without referring to a few projects which to my mind are of preëminent importance. The first is the Health Conservation Contest which we have been conducting in conjunction with the Chamber of Commerce of the United States. This continues to be the most dramatic and practical service of the Association. The contest now reaches directly over 260 cities in 45 states with an aggregate population of close to 30 millions, or about one-quarter of the total population of the country. These cities have directly profited by the knowledge gained through the surveys, by the advice and guidance of our field staff, and by the widespread dis-

semination of good public health information in the community. Indirectly, many more cities with large populations have been favorably affected; for it is impossible to conduct a contest of the magnitude of ours without having its influence spread far beyond the limits of the cities enrolled.

The record of the contest is replete with valuable results. It is significant that the cities enrolled take part in the contest year after year and show improvement in their consecutive scores. More than 90 per cent of all the cities which were entered more than once, received higher scores last year than in any preceding year, in spite of the fact that 50 points were taken off the possible maximum. The average score among the 36 cities which won or received honorable mention in 1931 was approximately 88 per cent of our reasonable standards, and the average expenditure to attain this was only \$1.71 per capita. The average score for all cities in the contest for 1931 was 650, as compared with an average score of 542 for 1929. Probably the most important result is the very real interest in the public health movement which the contest has evoked among prominent business men of the country. From 2,000 to 3,000 such leaders have become actively interested in community health and have in this way become allies and supporters of local health officers. Our contest has convinced these influential citizens that by improving the public health, they can at the same time benefit the financial standing of their communities. The Health Contest has passed the experimental stage and we may all look forward to its expansion until it covers virtually the whole country.

The second activity which, I believe, calls for special mention is the publication of the revised edition of *Community Health Organization*. This was prepared under the supervision of the Sub-Committee on Community Health Organization of the Committee on Administrative Practice and has been most carefully edited by Prof. Ira V. Hiscock. We are grateful to the Commonwealth Fund for doing a beautiful printing job and for distributing the volume. Every health officer in the country now has available to him in brief compass a well written and practical treatise on the most approved health practices. The problems of personnel, of administration, of budgeting, are all considered clearly and soundly. It is altogether a monumental work. I hope it will find its way into the hands of every health officer, not only in the United States and Canada, but in all other countries where public health administration is conducted along similar lines. It will certainly help to raise standards of technical health service to a very high level.



I wish it were possible to refer in the same detail to other valuable activities of the Association, such as the revision of the *Appraisal Form for Rural Health Work* made by Dr. Bishop's Committee, the revision of our *Standard Methods for the Examination of Water and Sewage* made by our Committee on Standard Methods in coöperation with the American Water Works Association, the operations of the sub-Committee on Training and Personnel under the leadership of Professor Turner, the excellent work done by our large Western Branch and the organization of the Southern Branch. I am compelled, however, to limit myself to the high spots and will ask those who are associated with other valuable services to forgive me. I can only say that in turning the Association over to Dr. Ferrell I am delighted to report that all is well. The Association has never been better organized, or possessed a more enthusiastic membership, or had a clearer conception of its service, or awaited a more brilliant future.

#### THE HEALTH OF THE COUNTRY

It is particularly gratifying to note the very favorable health conditions that have prevailed throughout the United States and Canada during the last year. By and large, the health of the people as measured by the reports of sickness and deaths has never been better, in spite of the fact that this is the third year of serious economic depression. With possibly 10 millions unemployed and with the general state of mind clouded with many perplexities and uncertainties, the health of our communities has apparently stood up well.

Sickness and death rates are either the lowest in the history of the country or very close to it. Early in the year, the Surgeon-General of the U. S. Public Health Service reported that the death rate in 82 large cities had been 11.8 per 1,000 in 1931, as compared with 11.9 the year before. Since then, morbidity and mortality have continued each month at an extremely low level. For the first 37 weeks of 1932, General Cumming reports a death rate of 11.2 for 85 large cities, as compared with 12.1 for the same period in 1931. The industrial life insurance companies, whose experience is also indicative of what is transpiring in the general population, are likewise reporting the lowest mortality rates among their policy holders. In the largest of these companies, the cumulative experience up to the end of September this year was about 3 per cent lower than last year which was an excellent health year. The best feature of this picture is the fact that there is no evidence as yet that the depression has adversely affected the physical resistance of the people.

Infant mortality, deaths from the communicable diseases of chil-

dren, tuberculosis, and pneumonia—all of which we have in the past, either rightfully or wrongfully, associated with the level of the standard of living—have continued to decline this year. Tuberculosis and pneumonia are remarkable in this regard, showing rates respectively about 7 and 17 per cent lower than last year. I should, however, point out that our records throw no light on the mental health of the people which must be anything but good. Nor can I avoid the fear that, should present conditions continue, we will soon become aware of the consequences of malnutrition of children in terms of disease and mortality records. To date, I am glad to say there are only a few authentic observations pointing in this direction. The available facts, especially on mortality, may give all of us who are concerned with the public health, encouragement, satisfaction and pride.

I have speculated as to what underlies the satisfactory health picture, and will consider briefly some of the factors which are probably involved in the situation. There is first the favorable meteorological conditions which have prevailed. The weather was propitious both last winter and this summer, and as a result many people were able to lead an active outdoor life. In addition, there were no serious epidemics of disease. Influenza was less widespread this year than it has been recently; the cases that occurred were much less virulent and resulted in fewer attacks of pneumonia and other fatal complications. I would mention also changes in the mode of life which have been forced on many people during the depression and which probably contributed to better health habits. There has undoubtedly been less over-drinking and over-feeding. People have been less exposed to the hazards of machinery. Unemployment, much against their will, has brought them rest and leisure, more sunshine, and opportunities for outdoor exercise, all of which play a part in keeping people well.

But I am inclined to believe that the most important factor in the situation is the continued and effective functioning of the health departments, the medical profession, and the social service agencies. These deserve our highest praise. They have all carried their heavy burdens cheerfully and have performed their tasks in a highly efficient manner. The organizations which have grown up during the last 30 years, the health departments, the medical clinics and the hospitals, have waited for just this opportunity to demonstrate their usefulness. When people could no longer pay for private medical care, they received much free treatment from doctors. Everywhere they found the public departments of health, the private welfare socie-

ties, the hospitals and dispensaries ready and happy to serve them. I have no doubt at all that these agencies have helped to keep up the public morale, have carried on essential work and have tided many a family over a very difficult period. Especially valuable has been the educational work they have conducted for many years prior to the depression and which is now serving as a reservoir of knowledge upon which the public continues to draw. I can report with enthusiasm on the operations of the public health and social agencies during the last few years.

But my enthusiasm must be somewhat tempered. I realize that these organizations have gone through a very trying time. Under pressure of the economic stringency, states and cities and philanthropic societies have been forced to give very serious consideration to economies in their budgets and many health activities have suffered in consequence.

#### RECENT REDUCTIONS IN HEALTH BUDGETS

At the beginning of this year when the first rumblings of reduced budgets and of curtailed staffs became audible, the Association launched an inquiry among the health officers of the country to determine the extent to which the financial stringency was affecting them. We received 200 replies. Over 50 per cent had already suffered a budget cut. These varied in amount but averaged 7.4 per cent. The cities, particularly the larger ones, suffered more than the counties or states. But apart from a few outstanding instances, the reductions were small and were easily absorbed either through a slight reduction in the salary scale of the staff or through a contraction of the less important activities. More ominous was the fact that 56 health officers reported that further cuts were in prospect.

To bring our knowledge up to date and to determine, if possible, how serious the situation is at the moment, I sent out another questionnaire about a month ago to the same group of health officers. We have already received 345 replies from 40 states, 165 counties, and 140 cities. Our material is fairly representative, covering health departments in every part of the country. There has been no reduction of the health budget in 1932 in 24 states, 48 counties, and 45 cities, although in many of these, there had been a cut in the preceding year. In the remaining 228 offices, there were reductions varying all the way from less than 5 per cent as a minimum to a maximum where the department has been entirely eliminated. The average reduction in these 228 departments was about 11 per cent. Again we find that the cities, particularly those with more than 500,000

population, suffered most. Detroit, Pittsburgh, and Baltimore were most severely affected. Toledo, Akron, Norfolk, and Houston, received big cuts. The reductions in a few of the states were particularly large. In North Carolina, a general reduction of 33 1/3 per cent was made. In Florida and in New Jersey, the reductions were about 20 per cent, and in Ohio, 17 per cent. New York State fortunately suffered no loss but rather received an increase in its budget. A number of county health organizations, including Coffee County, Ga., McCurtain County, Okla., Greenwood County, Kans., were discontinued. In Anderson County, S. C., a budget of \$91,000 in 1931 was cut to \$7,000 in 1932. In Orange County, Calif., and in Marion County, Ore., the budgets were reduced about one-third. A large number of health officers continued to report that further cuts were in contemplation.

TABLE I

## SURVEY OF EXPENDITURES BY PUBLIC HEALTH DEPARTMENTS IN 1932

	<i>Total</i>	<i>States</i>	<i>Counties</i>	<i>Cities</i>
Total number of questionnaires returned..	345	40	165	140
Number of health officers supplying budget data .....	304	33	144	127
Total amount of budgets reported for 1931 .....	\$50,647,431	\$17,258,682	\$2,638,017	\$30,750,732
Total amount of budgets reported for 1932 .....	47,011,886	17,290,615	2,357,892	27,363,379
Net increase (+) or decrease (—) in 1932 .....	—3,635,545	+31,933	—280,125	—3,387,353
Per capita Health Office expenditure in 1931 .....		.18	.42	1.13
Per capita Health Office expenditure in 1932 .....		.18	.37	.99
Number of health officers reporting budget reductions in 1932.....	228	16	117	95
Total amount of budget reduction in Departments reporting reductions in 1932 .....	\$4,678,135	\$882,634	\$341,281	\$3,454,220
Percentage of reduction in above Departments .....	11.1	8.4	16.7	11.6
Number of health officers reporting salary reductions in 1932.....	135	11	68	56
Number of health officers reporting reduction of one or more activities in 1932....	147	18	73	56
Number of health officers anticipating further cuts in 1932.....	53	11	24	18
Personnel dropped during 1931 and 1932				
Total .....	1,242	222	153	867
Physicians and dentists.....	237	20	24	193
Nurses .....	362	52	66	244
Others .....	643	150	63	430

Needless to say, such drastic changes required rapid and thoroughgoing adjustments. In 135 departments, salaries were reduced in varying amounts, and in many other instances a loss of

personnel was also made necessary by the reduced resources. Our record is obviously incomplete but it shows that in these 345 departments there was a total loss of well over 1200 persons, including physicians and nurses. Detroit alone lost over 100 employees, and Baltimore dropped 93 from its staff. It is furthermore significant that in the adjustment of activities, certain branches of health work suffered more than others. Child welfare and public health nursing, for example, seemed to have borne the brunt of the reductions. On the other hand, tuberculosis activities were, for the most part, disturbed hardly at all. It would be interesting to know what determined this peculiar policy in so many of the communities. Was it not because those in charge of tuberculosis work were better able to convince their communities of the importance of their efforts?

The present tendency to cut public health expenditures is of grave concern to all interested in the nation's welfare. Throughout the year, your Association has done everything possible to maintain health budgets. Your President has addressed many meetings and has written hundreds of letters on your behalf urging local leaders in both business and welfare work to keep the health facilities of their communities intact. Nevertheless, as we have seen, reductions have occurred and in many places, they have been large enough to do serious damage to the organizations. Nothing can be more certain than that in the past the health departments of the country have not been over-extended. Health officers and health workers generally have been notoriously underpaid. Health departments have been understaffed and their budgets do not, therefore, lend themselves to deflation. We know, for example, that the average expenditure for all health services both public and private in a group of 175 cities, for which reasonably accurate information was available through the Health Conservation Contest last year, was only \$1.12 per capita per annum. Even in the 36 cities which won the highest awards, the average expenditure was \$1.71. On the other hand, 15 per cent of the cities spent less than \$.50 per capita; 17 per cent spent between \$.50 and \$.75; and 13 per cent between \$.75 and \$1. Only a little more than one-half spent over \$1 per capita, including both official and voluntary public health agencies. These figures are for cities which have shown real interest in public health work and their expenditures are undoubtedly higher than for cities in general.

In the counties, the budgetary situation has been much worse. Only a quarter of the 2,000 counties in the United States have anything like adequate or full-time health service. Even in the counties where there has been some attempt at organization, the average

expenditure was only \$.38 in spite of the fact that county health service, by its very nature, calls for larger per capita costs than do cities. Only a very few counties show expenditures of \$1 or more. The appropriations of the states necessarily supplement those of the municipalities and counties. Nevertheless, state health appropriations are still very small. In 1930 they averaged only \$.13 per capita, ranging from less than \$.01 in Nebraska to \$.35 per capita in Delaware.

Altogether, we are spending something like 120 million dollars, or about \$1 per capita for health work of all kinds whether administered by official or by private agencies. This is the amount which in the heyday of public expenditure was allocated for this important service. On its very face, this amount is only a fraction of what is needed. The modest estimates prepared by our Committee on Administrative Practice call for appropriations of \$2.50 per capita if a well rounded program is to be maintained. In the counties, where health work is more difficult to conduct because of the distances to be covered, the expenditure to be adequate should be nearer \$3 per capita. In other words, our expenditures in the past have never reached more than from one-half to one-third of what we could spend profitably. There has been no wild development and no tendency to grow too fast. Very few communities have ever spent enough to derive the great benefits that sanitary science and modern medicine have made possible. It is with meager amounts indeed, that genuine achievements in disease control have been accomplished. We are still very far from where we can afford to cut down on public health work.

What we need in the present emergency more than anything else is to spread among the people, and especially among the leaders, a true concept of the importance of public health in the social economy of the nation. This is obviously your duty. You, who represent the strength and leadership of the nation's health workers, must go back to your communities and broadcast the message I have just given you. Sound the alarm and arouse the public to a realization of the situation that is threatening. It is especially desirable that you win the support of your local medical societies, the chambers of commerce, the business men's groups generally, the women's clubs, and particularly the press. Make them all realize that the maintenance of the public health at high levels is vital to the public welfare. Better times are bound to come. The present emergency which has necessitated the paring and cutting of budgets will undoubtedly pass. The most important question for us is whether the leaders of our states and cities will then restore health appropriations because they appreciate

the basic position of the health movement in modern society. It is essential that this concept be clearly understood, and I propose to clarify it in the final section of my address.

#### HEALTH AS A FACTOR IN SOCIAL ECONOMY

Little do most of us appreciate the influence which the public health movement has had on our times. It has made a different world for us to live in. Sixty years ago, when Pasteur and Koch were making their astounding discoveries, life was still very cheap. The death rate even in our country was about 20 per 1,000 according to our best estimates. Of the children born in any year, 20 per cent were dead before their first birthday. Diphtheria and the other diseases of childhood decimated them during their toddler years. Typhoid fever and malaria laid their heavy toll on adolescents, and tuberculosis was a constant menace to young adults, breaking up families and causing much poverty and misery. The expectation of life under the conditions then prevailing was just over 40 years. It was indeed a fortunate family that did not show the marks of premature bereavement; no wonder people were so keenly aware of health hazards!

How different is the picture today. The expectation of life of the new-born is now 60 and not 40 years. The infant mortality is not 20 per cent, but only a little more than 6. Children need not get diphtheria, nor young people typhoid fever; and if parents and teachers are watchful, young men and women need not suffer from tuberculosis. The heavy hand of disease and the possibility of premature death has been lifted from the families of the country, permitting them to work out their destinies within the limits of their native abilities. These changes have revolutionized our social economy. They have made it possible to build up our cities into enormous aggregations of people. The extensive urbanization of our population would have been impossible but for our increased knowledge of the nature of the communicable diseases and how best to control them. We ordinarily completely overlook our dependence on sanitation and the many other activities of our health services.

The public health movement has added enormously to our wealth and capacity to live well. For a number of years I have attempted to demonstrate that life and health are our greatest assets. In *The Money Value of a Man*, Dr. Lotka and I have compiled figures which show the commuted values of net future earnings of people in various income classes and at various ages of life. Our calculations indicate that the money value of our people transcends all other forms of

capital and the aggregate is, in fact, 5 times as great as the total of all of our material resources. These figures and our mode of approach are coming more and more into general use, not only here but in other parts of the world. Professor Winslow especially has performed a valuable service in applying the tables to various places, including the cities of Syracuse and New York where extensive public health projects have been conducted in recent years. He has shown that the reductions in death rates from a few of the diseases which undoubtedly respond to organized effort have resulted in enormous savings of capital values. In New York City, for example, an annual expenditure of less than 15 million dollars for health promotion of all sorts by public and private agencies has produced an aggregate saving of over 200 million dollars annually. In Syracuse, the mortality reductions for a limited number of age groups and for a few diseases represent a saving of 3 million dollars a year accruing from a total health budget of less than \$500,000. Dr. Shepard of San Francisco has in a similar manner calculated the savings which have been or could be accomplished in some of our western states through the strengthening of their public health services. Dr. Pollock has computed the money losses resulting from mental disease. Others, I am confident, will be tempted to utilize the figures which we have made available, to show the wide disparity between the savings resulting from competent public health work and the low cost at which these savings are made possible.

I need not amplify this thesis here except to say that the public must become more generally aware of the great economic value which human beings possess and the enormous losses which communities sustain when workers are thrown out of employment because of illness or when premature death deprives families of their support. This has not been an academic discussion; nor is our computation one of paper values. Our findings have perfectly definite and practical implications. When a death from typhoid fever occurs, it is not only the family that suffers the loss of many thousands of dollars. This loss is soon distributed over the whole community. Reduced taxes come into the public treasury. The community is often forced to maintain the dependents of the deceased, and very often must assume the added cost of providing over long periods for neglected children and disrupted homes. We do not ordinarily recognize the solidarity between the community and the individuals that compose it. I would not stress the money value of life except that such evaluation helps to make us aware of our mutual interdependence and the significance of each individual to the modern state.



If we were then motivated by only the most selfish considerations, we would be very careful to maintain our public health services at the very height of their efficiency even during periods of depression. It is obviously penny wise and pound foolish to do anything else. After all, public health work as it is conducted even in the best departments, costs very little. From \$2 to \$3 per capita would give most places excellent service, worth many times that amount. No community even at present is so poor that it cannot afford to safeguard the life of its citizens. No city, county, or state can run the grave risk of wrecking the public health organization which has been built up over many years. This is certainly no time to drive trained public health servants out of the profession; nor to drop well tried and useful activities. Unless we are very careful, we may through these attempts at false economy let loose forces which will undermine our very capacity for speedy economic recovery. I hate to think what it would mean in cold dollars and cents if we were suddenly confronted with epidemics of typhoid fever, of smallpox, or of diphtheria. The health protection of our communities is like a dyke which prevents the ravages of a flood. Once our defenses are weakened, increased sickness and death would make economic recovery all the more difficult. If governmental economy is necessary (and everyone is agreed that it is), there are many types of activity less vital that should be curtailed first—not one that threatens life itself.

But I am loath to rest my argument for public health service on economic grounds alone. The knowledge and practice of good public health have enriched every phase of modern life. They have raised the very quality of our civilization. The control of disease has banished the fear of premature death and has thus added to the joy and cheerfulness of life, as is evident when we compare conditions here with those prevailing in the Orient. The reduction of physical disabilities has made life fuller, diverting energies that were formerly utilized in the struggle to live into more constructive channels. When people no longer have to fight against pestilence and plague, they have time to devote to the peaceful arts and to other creative activities. The status of the family is being changed as a result of the health movement. The family group is now kept together until the children have reached maturity. No one can possibly overestimate the significance of this to the well-being of the next generation. The survival of young children has made it possible for us to balance our population without undue childbearing, thus releasing the energy of the mother to other activities of the family and the community. Richer content has been given to social life which has rapidly filtered

down to the benefit of the individual man, the ultimate and only real unit of value.

As in the field of medicine, public health work makes no distinction between the rich and the poor, between the high and the low. The prevention like the cure of disease knows no levels. The method and spirit of this movement maintains the finest of democratic traditions and holds out the largest promise for a glorious future. It is this phase of health service that should give purpose and direction to our professional work.

Do we the health workers of America need a better creed or a greater inspiration to carry on? Ours is the great opportunity. When all the world is sick, when business falters and counsels waver, we at least know what to do. Let us be equal to the occasion! Let us maintain our high purpose to keep the people well against all odds. Our effort will help the nations weather the storm. I hope it may also show those in high places how other public services may best be conducted in a democratic government.

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## Doctors Differ

“DOCTORS differ” is a rebuke which the profession inherited when the title of doctor was, by common custom, extended to medical practitioners. It is well known that the saying had nothing to do with medicine, but was levied against theologians, not without some deserving. But now when it is used, and that is not infrequently, it is directed against the practitioners of the medical arts. Lord Dawson has, on several occasions, resented the innuendo of this popular saying. He has pointed out, with much truth and justice, that differences of opinion in medicine, the existence of which is beyond denial, are trivial when compared with the differences which are rife among politicians, theologians, sociologists, and, we might add, biologists, and are greater only than those among the practitioners of the physical sciences. The art of medicine is among the oldest things in human culture, but the science of medicine is one of the youngest. Originally founded on magic and superstition, not unmixed with craft, fostered and developed by observation and experience, it was not till the dawn of modern history that the art of medicine began to rest on logical deductions from established evidence—which is science—and it has not yet been able to shift over completely to this more solid foundation. Medicine is still in a transitional stage. Chemistry has discarded alchemy, astronomy has forgotten astrology, but medicine still embraces the mediaeval lore which in past ages took the place of science. Much of the nomenclature still used by us does not belong to science, and the use of words, however much their meaning may be modernized, carries with it traces of the philosophy which gave rise to them.—Abstract from Address by Lord Dawson of Penn in accepting the Presidency of the British Medical Association for the centenary year. *Med. Off.*, July 30, 1932, p. 41.

# Relapsing Fever in California

GILES S. PORTER, M.D., M. DORTHY BECK, AND  
I. M. STEVENS, F.A.P.H.A.

*California State Department of Public Health, San Francisco, Calif.*

ENDEMIC focuses of relapsing fever have been reported in Colorado, Texas, and California. In 1921, Dr. Le Roy Briggs of San Francisco reported 2 cases in which the infection was contracted at Polaris on the Truckee River, California. The diagnosis of both was confirmed by the demonstration of spirochetes in the blood and both responded to treatment with neoarsphenamin. These patients had been bitten on the legs by insects. Urticarial marks on their legs and blood spots on the bedding warranted this conclusion, but no bedbugs could be found and no ticks were seen at any time during the trip.

No further evidence of relapsing fever came to the attention of the California State Department of Public Health until September, 1930, when Dr. George Stevens, Epidemiologist, Los Angeles City Department of Health, reported a case in a school teacher who had lived at Big Bear Lake during July and August. About August 1 she suddenly developed a high fever, severe headache, generalized tenderness of the muscles, and slight dizziness. This illness lasted about 5 days and the patient was well until about August 15. The case was diagnosed during her fourth relapse on September 16 and the diagnosis confirmed by finding the spirochetes in the blood smear. The patient could not recall having been bitten by any insects but had noticed a red spot on her neck which she thought might have been a bite. She had not seen any bedbugs or ticks while there.

In October, 1930, Major V. H. Cornell, Letterman General Hospital, U. S. Army, reported, through the courtesy of the Commanding Officer, a case in which the infection had been contracted at Lake Tahoe where the patient had been from July 9 until July 24. His onset was July 27. The diagnosis was established September 8 when spirochetes were demonstrated in the blood smear. He had been bitten by mosquitoes but knew of no other bites.

Early in November, 1930, Dr. J. D. Dunshee, Health Officer of Pasadena, reported a case in a young man who had been at Lake Tahoe during August. On August 25 this patient had noticed the

bite of an insect under the right ear over the jugular vein which became swollen and very painful and remained swollen for 4 days. On September 9 he became ill and his symptoms recurred at intervals over a period of 3 weeks. Spirochetes were found in blood smears taken October 28.

When the first case of the 1931 season was reported in July, 1931, the State Board of Public Health passed a resolution making relapsing fever a reportable disease. Cases other than those brought to our attention had been diagnosed and it was therefore deemed advisable to conduct an investigation to determine the incidence of relapsing fever, the focuses, the ectoparasites involved in the transmission, and the reservoirs of infection.

To date, 30 cases have been recorded. A tabulation of these is presented here.

The history of Case 25 (C.M.W.) is of interest. This patient was a member of the group conducting field studies this year in the following relapsing fever focuses: Big Bear Valley May 16 to June 4; Lake Tahoe June 8 to June 22; and Packer Lake June 23 to June 30. His duties consisted of shooting and trapping rodents, searching brush and animals for ectoparasites, and laboratory work. He returned from Packer Lake June 30, and on the evening of July 1 developed a fever, headache, generalized pains, malaise, and had a severe chill. During the night he had several chills and his fever continued. He entered the hospital July 3 with a temperature of 102° F., pains in his chest, and a severe headache. The leukocyte count was 13,100 with 89 per cent polymorphonuclears. The following day his temperature was normal. Relapsing fever was suspected because he had been working in infected areas and spirochetes were demonstrated in the blood smear taken July 4. July 5 his temperature rose to 104° and he was given 0.3 gm. of neosalvarsan. His temperature gradually became normal, but the pains in his chest persisted for several days and general weakness continued for 2 weeks. A specimen of blood taken July 4 was inoculated into white mice and the spirochetes were recovered from them.

June 25, while at Packer Lake, this patient had picked up a bag containing 5 rodents recently shot and accidentally smeared some rodent blood on his hands, on which were several open lesions, and he washed them in disinfectant as soon as possible. The pooled specimen of blood from these 5 rodents was inoculated into a white mouse and spirochetes resembling *T. recurrentis* were recovered from the mouse. He was not bitten by any insects to his knowledge nor had he during that trip found any ticks recognized as transmitters of

# CALIFORNIA STATE DEPARTMENT OF PUBLIC HEALTH

## RELAPSING FEVER—CASES REPORTED TO SEPTEMBER 20, 1932

NO. NAME	AGE SEX	ONSET	RELAPSES	SOURCE OF INFECTION	LABORATORY FINDINGS	REMARKS
1. X.	46 M	8-11, 1921	8-24, 8-30	Polaris, Placer County. Insect bite on legs 8-3	Spirochetes in blood smear 8-25 and 8-30. Citrated blood negative in monkeys and mice	Reported by Le Roy H. Briggs, M.D., J.A.M.A. 79: 941 (Sept. 16), 1922 Insect as described appeared to resemble a bedbug more than ordinary tick. Neosalvarsan given to Mr. X and Mrs. X 8-31 No neosalvarsan given
2. X.	Adult F	8-14, 1921	8-23, 8-28	Polaris, Placer County. Insect bites on legs 8-6	Spirochetes in blood smear 8-23 and 8-30 and 8-31. Citrated blood negative in monkeys and mice	
3. A.E.Y.	62 M	9-8, 1923	9-15, 9-25	Traveling by automobile in Colorado and enroute from Denver to Los Angeles County, Calif. Stayed in auto camp Lake Tahoe—Ward Creek. Insect bites	Spirochetes in blood smear 9-26	
4. La P.	Adult F	1927 or 1928	?	No examinations made	No examinations made	
5. S.	Adult F	May, 1928	?	Insect bites at Ward Creek, Lake Tahoe	Spirochetes in blood smear	Missed case with satisfactory clinical history but not confirmed by laboratory examination Detailed history not available at time of investigation in 1931 History of febrile attacks every 10 days until March, 1931 Neosalvarsan given
6. M.T.	50 F	8-1, 1930	8-15, 9-2, 9-16	Insect bite on neck 7-20, at Big Bear, San Bernardino County	Spirochetes in blood smear 9-18	
7. F.M.B.	50 F	7-5, 1930	7-18, 7-28, 8-7, 8-31	Tick bite 6-29; tick found in bed after biting	Spirochetes in blood smear 8-31	
8. J.M.	33 M	9-9, 1930	10-13, 10-28 (Dates of earlier relapses not available)	Bitten by insect under right ear on 8-25. Bite painful and swollen 4 days	Spirochetes in blood smear 10-28	History indefinite for interval in September—statement given, after 9-12 temperature recurred off and on with febrile attacks at weekly or 10-day intervals No relapse after 9-7 but neosalvarsan was administered 9-30
9. A.McR.	41 M	7-27, 1930	8-3, 8-6, 8-18, 8-28, 9-7	Patient had been at Lake Tahoe near Carnelian Bay. No insect bites noted other than mosquitoes	Spirochetes in blood smear 9-8. Blood inoculated into rats 9-8 but findings negative	Case history obtained during 1931 investigation—history incomplete
10. R.P.	20 M	6-15, 1930	?	Patient had been in mining country near Salt Lake, Utah, and while there 10,000 sheep had passed through	Spirochetes in blood smear	
11. J.B.	5 M	6-6, 1931	One relapse about 6-17	Patient had been at Big Bear, San Bernardino County, Red spots on arm but no history of insect bites	One spirochete found in blood smear 6-17; many found during first relapse	
12. J.A.	5 F	7-9, 1931	7-17, 7-23, 8-3	Patient at Big Bear from 6-28 to onset of illness. Bitten by tick a few days after arrival there	Spirochetes in blood smear 8-6. Rat inoculated with 2 c.c. blood on 8-6 was positive	Neosalvarsan given 8-6
13. J.McC.	42 M	7-10, 1931	7-18	Patient from Lake Tahoe—no history of insect bites	Blood smear positive for spirochetes 7-20	Neosalvarsan given 7-21
14. H.P.	23 F	7-15, 1931	7-23, 7-31	Bitten by an insect a day or so after arriving at Lake Tahoe 7-10	Spirochetes found in blood smear. Animal inoculations positive	Neosalvarsan given—Governess to M.L. case

15. M.L.	12	F	7-18, 1931	7-26, 7-31	Bitten several times by insects, apparently ticks, soon after arrival at Lake Tahoe on 7-10	Spirochetes in blood smear 7-29. Animal inoculations positive	Neosalvarsan given on 7-31. Later 2 ornithodoros ticks found in the cottage
16. R.D.	8	M	7-13, 1931	7-24, 8-8, 8-21, 9-1	Patient went to Lake Tahoe 6-28 and was bitten by an insect before 7-4	Spirochetes in blood smear 9-1. Animal inoculations positive	Neosalvarsan given 9-1
17. A.W.	24	M	7-24, 1931	8-9, 8-16, 8-21	Patient went to Packer Lake, Sierra County, 7-17 and returned 7-29. No history of insect bite	Spirochetes in blood smear 8-22	Neosalvarsan given 8-23
18. L.C.	12	M	8-1, 1931	8-11, 8-19	Patient at Lake Tahoe all summer. No history of insect bites but later an ornithodoros tick was found in the cottage	Spirochetes in blood smear 8-19	No relapses after 8-19—so no neosalvarsan given
19. C.B.	Adult	M	?	Four attacks at intervals of 7 to 14 days	Patient resides at Lake Tahoe. No history of insect bites	Two sets of blood smears negative	Case diagnosed on clinical history. Patient resided in area from which 5 other cases originated
20. E.B.G.	Adult	M	Latter part July, 1931	Recurring attacks until 9-1 when he consulted a physician	Patient had taken several trips into Sierras, Lake Tahoe, and Mono and Inyo Counties	State Laboratory reported blood smears positive on 9-5	Patient seen late in September
21. C.C.	52	M	7-18, 1931	?	Patient and his brother had worked at Twin Bridges, Eldorado County, and slept in a tent. Had been bitten by deer flies only, as far as they knew	Negative	Physician reported cases in 1932—records incomplete but stated typical relapsing fever and responded to arsphenamine treatment
22. G.C.	56	M	7-1, 1931	?	Same as Case No. 21—brother	Negative	Same as Case No. 21
23. F.M.	Adult	M	2-1, 1932	Eight relapses at 8-day intervals over period of 9 weeks	Owens fur farm in Big Bear	Blood smears negative	Diagnosis on clinical history
24. G.E.C.	Adult	M	4-12, 1932	None	Accidental laboratory infection	Blood smears positive 4-19, 1932. Mice inoculated 4-19	Neosalvarsan given on 4-19
25. C.M.W.	29	M	7-1, 1932	None	At Packer Lake on special relapsing fever investigation and handled bloody squirrel proven infected with relapsing fever	Blood smears positive 7-4. Mice inoculated with blood taken 7-4 were positive	Neosalvarsan given 7-5. No relapses
26. S.G.	48	F	7-5, 1932	7-17	Patient had been at Lake Tahoe since middle of June. About 10 days before onset was bitten by "brown insect"	Blood taken 7-20. Smear negative but mice inoculated same day proved positive	Neosalvarsan given 7-20
27. H.S.	38	F	July, 1932	?	Patient's source of infection given as Big Bear	?	Report just received and history incomplete
28. H.H.	10	M	8-7, 1932	Diagnosed during third relapse 8-23	Patient had been camping at Big Bear and slept on the ground on blankets. No history of insect bites	Blood smear taken 8-23 positive	History still incomplete
29. L.K.	42	M	8-27, 1932	None	Patient at Lake Tahoe from about 8-18 to 9-7	Blood taken 8-28 and inoculated into mice proved positive	Neosalvarsan given
30. D.G.	9	M	?	?	Patient resided at Big Bear	Blood taken 9-10, 1932 and inoculated into mice proved positive.	Recent case, history incomplete

relapsing fever. His laboratory accident was followed 7 days after with a proven case of relapsing fever. This seems to present evidence that his infection was contracted by direct transfer of the spirochetes from the rodent.

The staff conducting the field studies included a bacteriologist, an entomologist and two rodent hunters. All operations were confined to those 3 areas in which all of the reported cases contracted their infection. This investigation was made in collaboration with Dr. K. F. Meyer, Director of the Hooper Foundation for Medical Research, University of California Medical School, and with W. B. Herms, Professor of Entomology, University of California.

A total of 894 rodents was either trapped or shot. A field laboratory was maintained as near the shooting and trapping areas as possible and blood smears were immediately made from the heart. During 1931, whenever possible, blood was taken from the heart and inoculated into white mice. In 1932, animal inoculations were made from all rodents. Later the animals were carefully combed for ectoparasites and then autopsied. All enlarged spleens were removed for further examination.

In the first survey, during the fall of 1931, blood smears were made from each rodent and only a few blood specimens were inoculated into mice. All of these inoculations into mice proved negative but one blood smear from a chipmunk shot near Polaris on the Truckee River which showed a spirochete, and a blood smear from a squirrel killed at Packer Lake which had a number of spirochetes resembling *T. recurrentis*.

The program for this investigation in 1932 was changed so as to provide opportunity for pooling specimens of blood from several of the same species of rodents. After making blood smears from each rodent, pooled blood was inoculated into white mice. To date spirochetes have been transferred to laboratory animals from 9 chipmunks and 2 squirrels. These findings indicate that the rodents play a part in the epidemiology of relapsing fever. Whether they serve as reservoirs of infection or whether they receive their infection from the ectoparasite which also transmits the infection to man, remains to be proved.

More detailed reports will be published when the experimental work included in the special investigation has been completed.

# Oysters and Anemia<sup>\*</sup>

E. J. COULSON

*United States Bureau of Fisheries*

AND

HAROLD LEVINE AND ROE E. REMINGTON

*Laboratory of the South Carolina Food Research Commission and the  
Department of Nutrition of the Medical College of the  
State of South Carolina; Charleston, S. C.*

NUTRITIONAL anemia is known to be quite prevalent in children. The majority of cases occur between the ages of 3 months and 2½ years; however, instances of anemia in children up to 5 years are not unusual. Mackay<sup>1</sup> reports that of the infants under 12 months of age which are brought to London clinics, 45 per cent of the breast-fed and 51 per cent of the artificially fed were found to be anemic. If diets low in iron are continued after the usual weaning time, the anemia continues to become more acute. The most outstanding feature of this anemia is that it lowers the resistance of the child to infections and disease.

The two types of secondary anemia occurring most commonly in the adult are chronic hemorrhagic and chlorotic anemia. The prevalence of these is not so well known because they frequently escape recognition and treatment. According to Powers and Murphy,<sup>2</sup> liver extract is of no value in the treatment of these types of anemia, but they respond very favorably to treatment with iron.

It has recently been reported by Levine, Remington and Culp<sup>3</sup> that the oyster is unusually potent in curing the nutritional anemia developed in rats by means of a milk diet. This effect was shown by them to be due to the inorganic elements of the oyster and, further, that elements other than iron, copper, and manganese were not concerned in the regeneration of hemoglobin. Iron and copper have long been known to be present in oysters in concentrations equalled by very few foods.

In the above investigation, oysters from only one locality were used and if this finding is to have practical application in establishing the status of the oyster as an important article of food, it is necessary

<sup>\*</sup> Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-first Annual Meeting at Washington, D. C., October 25, 1932.



to know what variations exist, as to the antianemic metals, among oysters from different producing areas and at different seasons of the year, as well as to what extent nutritional effect can be correlated with chemical analysis. In the study here reported samples of oysters were collected from all important producing areas on the Atlantic and Gulf Coasts of the United States.

The samples, furnished through the courtesy of oystermen in the various localities, were shipped, iced, in the usual 1-gallon containers. The entire contents of each can, on receipt, were transferred to a large porcelain dish; evaporated to dryness on a steam bath and dried in an oven to constant weight at 80° C.; after which they were ground and preserved in glass jars. Determinations of copper and manganese (Table I) were made by the methods employed in the previous work.<sup>3</sup> Iron was determined by the Kennedy method,<sup>4</sup> care being taken to

TABLE I

IRON, COPPER AND MANGANESE CONTENT OF OYSTERS FROM THE ATLANTIC AND GULF COASTS  
Results Expressed as Mg. per Kilo (Fresh Basis)

Locality	<i>Spring Samples</i> (Collected in April, 1931)			<i>Winter Samples</i> (Collected in Nov.-Dec., 1931)		
	Iron	Copper	Manganese	Iron	Copper	Manganese
<i>North Atlantic</i>						
Rhode Island	32.1	51.3	1.72	34.4	64.0	2.33
Connecticut	20.9	96.2	1.64	39.3	71.3	2.64
	35.1	122.9	3.16	47.1	137.2	2.82
New York	24.9	77.3	2.16	46.1	133.8	2.70
	30.3	67.8	3.00	38.8	74.7	2.82
	26.7	73.0	2.81	42.9	113.7	2.43
New Jersey	31.7	44.9	1.19	31.5	52.1	1.56
	29.1	41.2	1.05	45.3	34.4	2.45
Average	28.9±1.1	71.8±6.6	2.09±0.20	40.7±1.4	85.2±9.1	2.47±0.10
<i>South Atlantic</i>						
Maryland	70.1	38.0	3.01	51.0	23.3	2.69
Virginia	53.4	9.0	1.59	135.3	17.4	2.87
	50.0	37.9	2.17	60.8	36.9	2.41
	53.4	6.7	1.26	45.1	22.8	2.07
North Carolina	76.5	6.4	2.46	87.1	6.3	2.98
South Carolina	104.5	10.2	4.16	55.8	9.0	2.50
Florida	54.3	4.6	2.79	56.8	3.4	2.46
Average	66.0±5.0	16.1±3.8	2.49±0.25	70.3±8.1	17.0±3.0	2.57±0.08
<i>Gulf</i>						
Florida	61.3	11.6	3.98	83.1	20.2	3.58
	63.6	9.9	4.09	65.2	23.7	3.07
Alabama	74.8	5.9	4.00			
Mississippi	52.6	16.7	3.08	113.8	19.1	4.40
Louisiana	37.5	22.7	3.07	90.7	48.2	4.16
	74.5	18.6	4.33	65.8	20.8	3.70
	54.1	26.8	2.93	76.6	28.3	3.70
Average	59.8±3.4	16.0±1.9	3.50±0.15	82.5±5.0	26.7±3.0	3.77±0.13

adjust the acidity of the unknown to that of the standard. Although it is now quite generally conceded that manganese plays no part in hemoglobin building, its determination was included on account of the recent work of Orent and McCollum<sup>5</sup> on the significance of manganese in reproduction and lactation. Differences in the mineral content of the oysters from different localities will be noted from the table, those north of Maryland being lower in iron, and higher in copper than those of Maryland and states south, including the Gulf of Mexico. These differences are statistically significant and are undoubtedly due to the amounts of these metals available in the water or food of the oysters.

An examination of the values for iron and copper of the oyster, in comparison with the extended study of 120 different foods by Hodges and Peterson<sup>6</sup> and of 110 different vegetables and fruits by Stiebeling<sup>7</sup> shows that no other commonly used food except liver surpasses the oyster in the amounts of iron and copper which it furnishes to the diet by an average serving. We may therefore conclude that as a source of these two metals of blood building potency, the oyster is comparable only with liver (Table II).

TABLE II

RELATIVE IRON AND COPPER CONTENT OF SERVING PORTIONS OF SOME COMMON FOODS \*  
WHICH ARE EXCELLENT SOURCES OF IRON

	No. of Samples	Portion gm.	Iron mg.	Copper mg.
Pork liver	4	100	25.00	0.65
Beef liver	4	100	8.30	2.15
Oysters†	43	110	6.20	4.50
Calf liver	4	100	5.40	4.41
Lean beef	2	114	4.45	0.11
Limia beans	3	50	4.31	0.43
Common or kidney beans	9	50	3.97	0.34
Lamb chops	(?)	96	3.20	0.40
Beet greens	3	100	3.13	0.09
Chard	3	100	3.00	0.11
Spinach	23	100	2.55	0.12
Peas	12	100	2.07	0.24

\* The material for this table was obtained from Hodges and Peterson<sup>6</sup> and Stiebeling.<sup>7</sup>

† Average of 43 samples from different localities analyzed by us.

In order to test the potency of oysters from different localities in blood building, samples from 14 areas in 13 states were fed to anemic rats. The anemia was produced and the animals were handled in a manner similar to that used in a preceding work.<sup>8</sup> Either 6 or 7 rats were fed on each oyster sample, the sexes being equally divided in the group of 6, 4 males being used in each group of 7. No group contained litter mates.

During the curative period, all oysters were fed at the same level, equivalent to 5 gm. of fresh oyster per rat per day. This level of oyster yielded from 0.137 mg. to 0.523 mg. of iron per day. The samples lowest in iron yielded somewhat less than the amount previously found<sup>3</sup> necessary to bring about complete recovery in 8 weeks (0.17–0.30 mg.), while the one highest in iron yielded slightly more than the amount usually considered optimum for the rat (0.50 mg.). After the first day or two the rats ate the oysters eagerly.

In addition to the 14 groups receiving oysters, 3 control groups were also fed. Two of these received milk plus iron, 1 at the highest level furnished by an oyster sample and 1 at the lowest. A third group received milk only. The 2 iron-fed groups are included in order to demonstrate that the building of hemoglobin in the oyster-fed rats is due to the supplementing of iron by another factor.

Table III shows the amounts of iron and copper furnished each rat per day through supplements, as well as the time in weeks necessary to bring about recovery, which we have placed at 14 gm. hemoglobin.<sup>3</sup> The milk furnished 0.032 mg. of Fe and 0.014 mg. Cu daily. In this table, the various oyster samples are arranged in order of descending iron content, and it will be noted that there is a definite

TABLE III

SHOWING AMOUNTS OF IRON AND COPPER FURNISHED IN THE DAILY SUPPLEMENTS,  
AND THE RATE OF HEMOGLOBIN REGENERATION

Each rat received 5 gm. oysters (fresh basis) daily.

Group No.	Locale	Iron (mg.)	Copper (mg.)	Time* to reach Normal Hemoglobin Concentration
<i>Oysters</i>				
IX	South Carolina	0.523	0.051	3.2
VIII	North Carolina	0.383	0.032	5.8
XI	Alabama	0.374	0.030	4.8
XIV	California	0.354	0.038	4.4
V	Maryland	0.351	0.190	5.6
X	Florida	0.299	0.044	4.6
XIII	Louisiana	0.277	0.114	6.0
VII	Virginia—B	0.267	0.040	6.2
XII	Mississippi	0.263	0.084	5.4
VI	Virginia—A	0.250	0.190	6.0
I	Rhode Island	0.161	0.257	8+
IV	New Jersey	0.152	0.216	8+
II	Connecticut	0.140	0.548	8+
III	New York	0.137	0.364	8+
<i>Controls</i>				
XV	FeCl <sub>2</sub>	0.523		8+
XVI	FeCl <sub>2</sub>	0.137	(only slight improvement)	
XVII	Milk only		(continued decline)	

\* In weeks.

correlation between iron content and time of recovery, while no such relationship as to copper exists. In other words, all oysters contain an abundance of copper, and when fed at the level chosen in this study, it is iron rather than copper which fixes the rate of recovery. Rates of growth and hemoglobin response are represented graphically in Figure I.

It should be remembered in interpreting the results shown in Table III and Figure I that the dosage of 5 gm. of oysters per rat per day was purposely chosen to yield amounts of iron at or near the minimum effective level, since only in this way differences in hematopoietic potency can be quantitatively demonstrated. Therefore, the fact that the rats in 4 of the oyster groups failed to recover in the 8-week experimental period does not indicate that these oysters are not good sources of hemoglobin building material, for had they been fed at a slightly higher level, good regeneration would undoubtedly have resulted. Likewise, had the experiment been continued a few weeks longer the animals would doubtless have fully recovered. In fact, group II at the end of an additional 8 weeks of oyster feeding (same level) had an average hemoglobin content of 16.06 mg. per 100 c.c

The calorie intake of our rats was not far from 50 per day. Fresh

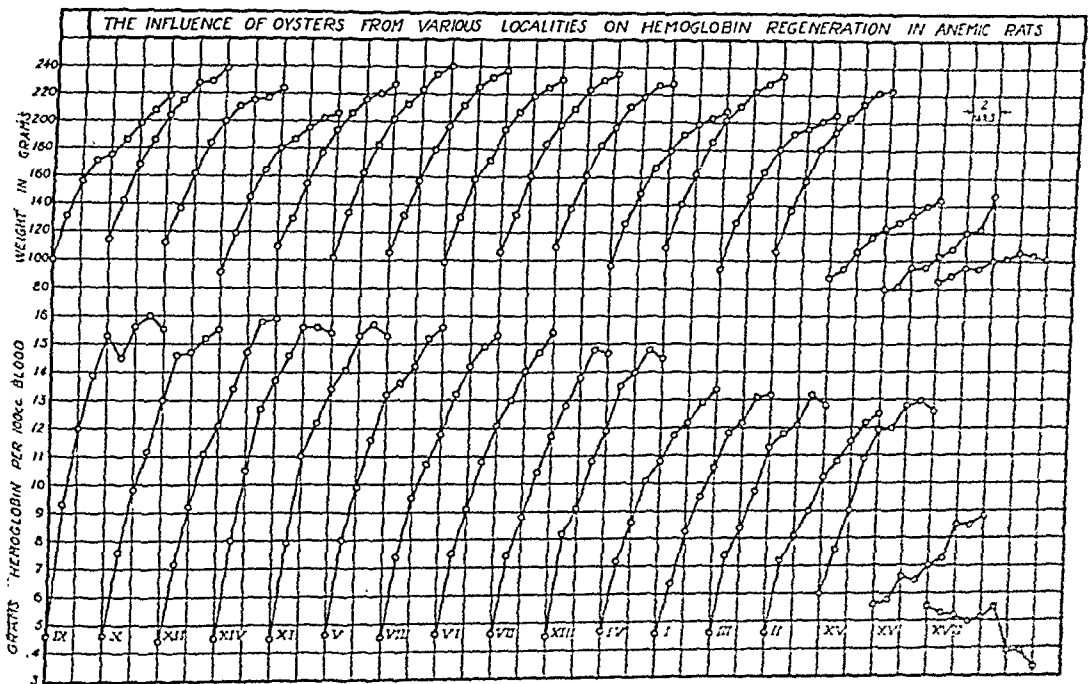


FIGURE I. Showing Growth and Hemoglobin Curves for Rats on Whole Milk Powder and Whole Milk Powder Plus Supplements

Groups I to XIV inclusive are the groups receiving the oyster supplements (Table III). Group XV received a supplement of 0.523 mg. iron daily. Group XVI received 0.127 mg. iron daily and group XVII received powdered milk only.

oysters yield about 0.5 calorie per gm.; hence the rats received about 5 per cent of their calorie intake in the form of oysters, and this was adequate for regeneration of hemoglobin.

### SUMMARY AND CONCLUSIONS

The results reported here show that the oyster is equalled or excelled only by liver in the amounts of iron and copper which it may furnish to the diet in an average serving. That these metals are easily available for hemoglobin production has been shown in previous work in which it was found that oysters, oyster ash (acid soluble) and a solution of iron, copper and manganese in the same quantities, fed to anemic rats, brought about hemoglobin regeneration at the same rate in all three cases. Oysters should, therefore, be efficacious in the treatment or prevention of those types of secondary anemia which respond to treatment with iron or iron plus copper. There is increasing support for the view that dietary deficiencies can best be corrected by proper selection of foods, rather than by the use of artificial concentrates or medicinal mixtures. In order to insure an adequate supply of the inorganic constituents for hemoglobin production it would seem a wise plan also to include oysters in the diet of the pernicious anemia patient in conjunction with liver extract, since it is known that liver extract is relatively low in iron.

An average serving of oysters (110 gm.) would furnish about 2 per cent of the human calorie requirement (3,000 calories), and yield about 41 per cent of the daily dietary standard for iron, stated by Sherman<sup>9</sup> to be about 15 mg.

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# Child Hygiene\*

JAMES FREDERICK ROGERS, M.D., DR.P.H.

*Consultant in Hygiene and Specialist in Health Education, U. S. Office  
of Education, Department of the Interior, Washington, D. C.*

THE child passes through five periods of existence, more sharply defined than Shakespeare's seven ages of man. In each of these periods there is need of hygiene if the child is to live, and live his life to the full.

There is the prenatal period, in which, at a headlong pace, the child recapitulates in 9 months the course which his ancestors covered in as many million years and in which 98 per cent of his energy for growth is expended. It is little wonder that, throughout this first portion of his career, the new being holds his breath lest something go wrong with the marvelous multiplication and modification of his living units.

Prenatal hygiene is of great importance even if it has to do only with symptoms and signs that things are going wrong with the maternal host, but there is in addition the very serious problem of anticipating and providing amply, through the host, for every need of the unseen being so that none of the myriad bricks of the human edifice will have to be made without straw.

Besides the problem of adequate building materials for the new being there is already at this early stage the possible threat of damage or destruction by a parasite—and especially by the pale spirochete. The danger is not to be overestimated, ill judged, or considered wholesale; but it exists as a frequent menace of the period. There is also at this period the danger of serious injury from conditions to which the mother may be daily exposed in industry.

The health of the unborn child is bound up with the welfare of the mother in all its phases. It is the business of hygiene to protect the mother during this period, by laws if need be, and to make the mother aware of the needs of the child. It would introduce her to the sources of information and aid, for herself and child, in the person of the private physician, the public clinic, and the printed page.

The second phase of the child's career begins and ends in a

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day. His day of birth is more beset with danger than any future day, even in our machine age, and the short journey the child must make is more fraught with peril than any later excursion of a million times the distance at a million times the speed. It is little wonder that the infant gives a gasp of relief if he escapes the birth canal by nothing worse than a tight squeeze.

Hygiene would reduce the many possible mishaps of this passage of the child from his marine to his terrestrial existence, mishaps, which, if they do not destroy him, may mar his mentality or cripple his body through all his future years. Hygiene would discover beforehand menacing mechanical conditions in the mother, or in the child himself, and take advantage of this knowledge for their safety. It would seek to improve the assistance offered by physician, midwife, or nurse during this hazardous performance.

If through good fortune or special hygienic measures the child has avoided invasion by the organism of syphilis, its fellow, the gonococcus, may be lying in wait to ruin his most precious sensory possession. Thousands of living mortals have to thank so simple a hygienic measure as the instillation of a drop of silver nitrate that they are not in an institution for the blind.

The child enters the third period of existence, his infancy, with a cry of distress at finding himself bereft of steady warmth, of ready-to-use food materials, and a relative freedom from the pest of parasites which will prey upon him through all the remaining phases of his existence.

Hygiene hears a helpless demand for more than something that will fill the infant's belly without causing colic. There is a call for everything which is needed to complete the human mechanism already so nearly finished. There is also much need for cleanliness, for warmth, for quiet, for open air, and for opportunity to stretch and kick. Fortunately we are nearly able to understand and to supply the child's needs, but this understanding and supply are not yet for every child. Hygiene has much to do in spreading its present knowledge. Scurvy is now infrequent, but gross or radioscopic signs still mark the majority of children as badly nourished.

That pearl or diamond which makes its appearance in the child's mouth at about the 6th month of this third stage of his existence, and which creates so much excitement and comment among the beholders, is likely to prove a paste diamond or an imitation pearl. The possibility of preventing such biological shoddy (which suggests inferiority in other important structures of the body) is already in sight.

Even with the most auspicious augury for physical and mental development, the infant becomes a hotbed for fission funguses and other parasites to which he is exposed. Hygiene is still a bit helpless here but it has learned much. It affords protection from dysentery and typhoid, smallpox and diphtheria. It saves many a child from tuberculosis and scarlatina, and it often delays invasion by whooping cough and measles until a relatively safer time.

The period of infancy trails off all too soon into the fourth stage, in which the child adds to his accomplishments of air breathing and the metabolism of raw materials, those of locomotion and language, and by so doing adds to the possible dangers of his existence.

The realm of the mental life now unfolds its wonders, but with perplexing problems, including the questions of his own whence and whither. He also enters into the field of social experience with its give and take, its conflicts and compromises, and the anxieties and fears, and fear of fears, which it begets. Along lines of both mental and physical unfolding he needs sympathy and direction, and his immediate guides often need assistance.

As toddler, runabout, preschool child or what-you-may-call-him, exploring the mental and physical world, and mixing more or less with his kind, there is further opportunity for adding to his experiences with parasites, macroscopic, microscopic, and invisible, common and uncommon. Thanks to hygiene the child may enter boldly into many human contacts where death or disability were once nearly certain. By vaccination and isolation hygiene has made this a much safer world for the child in the fourth stage of his existence and by better medical and nursing care it has lessened the damage which may occur to him if he does not escape infection.

Hygiene would not merely think of communicable diseases and their prevention and cure. The child is still developing and it would ask the opinion of the physician as to his present condition and future needs. Periodical examinations are, however, not sufficient. Life is a daily and hourly business and so is health. The child who appears perfect by today's examination may be damaged or dead within a week. Those in direct charge should know the few conditions which the child needs for healthy growth and should be sensitized to the signs and symptoms that things are going well or ill.

Hygiene would guide the child into the few daily practices which bear on his physical and mental welfare. It would encourage him in doing those things which it thinks he ought to do and discourage him in those things which it is evident he ought not to do. Hygiene would lend an attentive ear to the child's researches in the realm of ideas



and would answer his questions concerning the fundamental facts of existence with seriousness and as much wisdom as it can muster.

Finally, the child steps over the threshold of the school and enters on the last and longest lap of his journey. In school he mixes more generally with his kind and finds larger possibilities for experience with microbes which he may have missed elsewhere. Hygiene would reduce these experiences to a minimum by belated vaccinations, and by cultivating the sympathy and wits of teachers and parents so that the danger of infection is reduced to a minimum and the care of the infected raised to a maximum.

Again, hygiene goes hunting periodically into the physical and mental make-up of the child, finding and treating conditions, most of which should have been found and treated or prevented long before, had hygiene been as wise a few years ago as she now is. We can expect the need for medical and dental care of the school child to diminish only with better hygiene for the preschool child, the infant, the child in process of birth, and the unborn. The need will certainly not become less until this is the case.

School hygiene seeks to establish healthful physical and mental practices which likewise should have been formed at an earlier time.

Hygiene hopes for an understanding on the part of teachers and parents of the mental capacities and needs of every child so that his school tasks will be a stimulus rather than a source of depression to body and spirit. Finally along with a thirst for other knowledge, hygiene hopes to arouse, in at least a considerable proportion of pupils, an interest in hygiene which may help them to make the most of their own lives and to make healthier and happier the lives of children which are to be.

In all its ambitions for the child, hygiene is dependent on the help of workers in every other field of public health and medicine. It receives this assistance in ample measure. Even cold and impersonal vital statistics offers at least encouragement, for its figures afford every evidence that hygiene has, in the brief period of its existence, made the life of the child far less precarious and woeful than it was in past ages. The star of hygiene shines with increasing luster on the pathway of every child from his early prenatal to his last school days. Its influence is checked by conditions of the hour which make for poverty and neglect, the chief enemies of child welfare, but hygiene hopes that out of present economic ills will come a better order of society in which the health of all children will be of first concern.

# A Ten-Year Study of Toxin-Antitoxin Mixture and the Schick Test in the Control of Institutional Diphtheria

C. C. YOUNG, D.P.H., F.A.P.H.A., AND G. D. CUMMINGS

*Michigan Department of Health, Lansing, Mich.*

THE first attempt on the part of the Michigan Department of Health to demonstrate practically the value of toxin-antitoxin mixture and the Schick test was started in October, 1920. It was felt that a study carried out on a relatively stationary, well controlled group of individuals over a period of years would be quite significant. The population of the Michigan Home and Training School at Lapeer was selected as a satisfactory test group.

The diphtheria situation in this institution in 1920 made the conditions for a study of the effectiveness of toxin-antitoxin mixture almost ideal. Diphtheria had been endemic in the institution since its establishment in 1895. In 1920, as in all previous years, the continued presence of diphtheria was a serious economic problem.

Sixteen hundred and fifty-two inmates were first Schick tested with 0.2 c.c. intradermal injections of 1/50 m.l.d. diphtheria toxin diluted in saline. All tests were controlled with 0.2 c.c. injections of heat-killed toxin. Readings were made at 2- and 5-day intervals. Throat swabs were taken on all inmates at the time readings were made and tests made to discover carriers of virulent diphtheria bacilli, who numbered 33, or 1.9 per cent of the population, concentrated in 11 of 17 cottages.

The survey revealed 251 Schick positive reactions, or 15.1 per cent of the population. All positive reactors were given 3 doses of 3 L+ toxin-antitoxin mixture. A retest of the positives in July, 1921 (27 were absent), revealed that the number had been reduced from 224 to 24. They were given a second course of treatment with toxin-antitoxin mixture.

All admissions to the institution after 1920 were either Schick tested and immunized when indicated, or were given 3 doses of toxin-antitoxin mixture with no preliminary test. About 1925, 0.1 L+ toxin-antitoxin mixture was substituted for the 3 L+ mixture formerly employed.

The 1928 population was Schick tested by the institution staff and the positive reactors numbered 344 or 12.3 per cent in a population of 2,784. No testing was done to check the efficiency of the immunizing treatment. The institution remained free of diphtheria from the time of first immunization in 1920 until 1929, when a few cases appeared. This freedom from the disease presented a striking improvement over conditions prior to 1920.

The 1931 population was Schick tested by members of the department, and 441 positive reactors, or 17.5 per cent, were found in a population of 2,513.

TABLE I

SCHICK REACTORS IN POPULATION RESIDENT IN INSTITUTION IN 1920, 1928, 1931

<i>Year</i>	<i>Population</i>	<i>Pos. Reactors</i>	<i>Neg. Reactors</i>	<i>Per Cent Pos. Reactors</i>
1920	1,652	251 *	1,401	15.1
1928	2,784	344	2,440	12.3
1931 †	2,513	441	2,072	17.5
1931 **	2,929	679	2,250	30.1

\* This number reduced to 24 by additional immunization by July, 1921.

† Excluding 1931 admissions.

\*\* Including 1931 admissions up to July 16, 1931.

The 1931 population included 1,006 who were inmates in 1920. This group was Schick tested in the 1920, 1928, and 1931 surveys, and was continuously resident for 11 years. The results on this group have been singled out for presentation in this paper (Table II).

TABLE II

SCHICK REACTIONS IN 1,006 INMATES RESIDENT IN INSTITUTION FROM 1920 TO 1931

<i>Year</i>	<i>Total</i>	<i>No. Positives</i>	<i>No. Negatives</i>	<i>Per Cent Positives</i>
1920	1,006	151	855	15.0
1921 *	1,006	11	995	1.0
1928 †	1,006	104	902	10.3
1931	1,006	154	852	15.3

\* Retest after immunization of positives, second course of injections given.

† Another course of injections given, but no retest.

It will be recalled that of the total 1920 population 15.1 per cent were positive (251 in 1,652). Of the 1,006 members of the 1920 population 15.0 per cent were positive, which is probably fairly representative of the entire 1920 population.

The significant fact is that 1,006 members of the 1920 population should be reduced to 1.0 per cent positive in 1921, by artificial immunization, then revert to 10.3 per cent positive in 1928 and 15.3 per cent in 1931, despite treatment of all of the 1928 positives.

The course of reactions when studied in detail over the 11-year period through 3 Schick surveys, clarifies the situation (Table III).

TABLE III

COURSE OF REACTIONS OF 151 INMATES SCHICK POSITIVE IN 1920 AND RESIDENT IN INSTITUTION UNTIL 1931

1920 Schick Survey	1921 Re-Schick after immunization of all positives		1928 Schick Survey All positives given 3 doses 0.1 L TAT		1931 Schick Survey	
Pos.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
82		82		82		82
32		32		32	32	
15		15	15 †			15
11		11	11 †		11	
2	2 *			2		2
3	3 *			3	3	
1	1 *		1 †			1
5	5 *		5 †		5	
151	11	140	32	119	51	100
151	151		151		151	

\* These positives given another course of injections (3L+) with no subsequent Schick test until 1928.

† These positive given another course of injection (0.1L+) with no subsequent Schick test until 1931.

Eighty-two, or 58.5 per cent, of the above 1920 positives negative in 1921 following immunization were still negative by 1931. Twenty-six, or 18.5 per cent, of the 140 1920 positives immunized and negative in 1921 had again become positive by 1928, and an additional 32, or 22.7 per cent, had become positive by 1931. Of the 140 negatives in 1921 58, or 41.4 per cent, returned to positive. This indicates that toxin-antitoxin mixture as an immunizing agent has been 58.6 per cent efficient over a 10-year span, or 81.5 per cent over 7 years, as measured by the Schick test. The number of 1921 negatives turned positive by 1928 (26) was only 6 less than the number turned positive between 1928 and 1931. The rate of change from artificially immunized negatives to positives was greatly accelerated for the 3-year period 1928-1931 as compared with the period 1921-1928. Beyond the 7-year period a decline in the level of immunity would therefore be expected.

Five inmates required 2 separate courses of treatment to produce the Schick negative state, 3 of whom had again become positive by 1931. Six inmates required 3 courses of treatment, only 1 of whom was negative in the 1931 survey. Altogether, the 1931 survey revealed 51 positives, or 33.7 per cent of the 151 positive in 1920. This latter figure should not be accepted as an indication of immunizing efficiency as it included 5 inmates positive in 1921, 1 positive in 1921 and 1928, and 5 positive in 1921, 1928, and 1931.

Seven hundred and one, or 81.9 per cent of the 1920 negatives, remained negative over the 11-year period; 72, or 8.4 per cent of

TABLE IV

COURSE OF REACTIONS OF 855 INMATES NEGATIVE TO SCHICK TEST IN 1920 AND CONTINUOUSLY RESIDENT IN THE INSTITUTION UNTIL 1931

1920 Schick Survey		1928 Schick Survey all positives given 3 doses 0.1 L+ TAT*		1931 Schick Survey	
Neg.		Pos.	Neg.	Pos.	Neg.
701			701		701
82			82	82	
51		51 *			51
21		21 *		21	
<hr/>		<hr/>	<hr/>	<hr/>	<hr/>
855		72	783	103	751
855		855		855	

\* These positives given a course of injections (0.1L.+).

the 1920 negatives, became positive by 1928; and an additional 82, or 9.5 per cent, by 1931—a total of 154, or 17.9 per cent. Fifty-one of the 72 positives in 1928 were negative in 1931 due to immunization, while 21 were still positive. The total number of positives by 1931 was 103, or 12.0 per cent.

Of the 1,006 inmates, 151, or 15.0 per cent, were positive to the Schick test in 1920. This group was reduced to 11 by 1921 due to immunization. Ten years later, following a Schick survey and a re-immunization of positives in 1928, there were 154 positives, or 15.3 per cent. The total of 154 positives was comprised of 51 (5.0 per cent of 1,006 inmates) of original 1920 positives immunized once, twice, or three times, and 103 (10.3 per cent of 1,006 inmates) of original 1920 negatives who had become positive by 1931.

TABLE V

COURSE OF REACTIONS OF 151 INMATES POSITIVE AND 855 INMATES NEGATIVE TO SCHICK TEST AND CONTINUOUSLY RESIDENT IN THE INSTITUTION UNTIL 1931

1920 Schick Survey		1921 Re-Schick after immunization		1928 Schick Survey		1931 Schick Survey	
Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
82			82		82		82
32			32		32	32	
15			15	15			15
11			11	11		11	
2		2			2		2
3		3			3	3	
1		1		1			1
5		5		5		5	
	701				701		701
	82				82	82	
	51			51			51
	21			21		21	
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
151	855	11	140	104	902	154	852
1,006		151		1,006		1,006	

## DISCUSSION

The first information of significance in the foregoing figures is the unusually low number of Schick positive reactors in the previously unimmunized 1920 population. This percentage was practically identical for the whole 1920 population and for the portion which remained in the institution until 1931. Schick surveys on free living groups of all ages have been uniformly higher in percentage positiveness to the Schick test (Zingher,<sup>1</sup> Ceconi,<sup>2</sup> O'Brien *et al.*,<sup>3</sup> Griswold,<sup>4</sup> Crooks,<sup>5</sup> Cruickshank<sup>6</sup>).

On the other hand, Zingher<sup>1</sup> has reported institutional survey figures of 7.0 per cent Schick positives among males and 10.0 per cent in females. The total figure exceeds the percentage positiveness of the 1920 population reported here by 2.0 per cent.

This low percentage coupled with the continuous presence of diphtheria in the institution prior to 1920 points to a definite causal relationship.

Many Schick survey reports have indicated that, in general, city groups of low economic level existing under crowded conditions, have shown a higher grade of immunity than other city groups living in better circumstances (Park,<sup>7</sup> Zingher,<sup>1</sup> McClelland<sup>8</sup>). Dudley<sup>9, 10</sup> has reported that exposure to diphtheria will result in a high grade of immunity.

In view of the fact that admissions to the Michigan Home and Training School after 1920 averaged from 40 to 60 per cent positive to the Schick test, it would appear that the high grade of immunity found in the 1920 population of this institution was due to continuous exposure to true or sub-clinical diphtheria.

A second point of interest is the fact that 1,006 inmates were 15.0 per cent positive to the 1920 Schick test and 15.3 per cent positive 11 years later, despite the fact that the 15 per cent positives in 1920 were reduced to 1 per cent by 1921 through immunization. The 1931 positive reactors were made up of earlier natural and artificial immunes. The number of 1920 positives shown to be immune in 1921 following treatment who returned to the positive state by 1928, and the increased rate of return between 1928 and 1931, points to a period of artificially conferred immunity approximating 7 years. The fact that diphtheria reappeared in the institution in 1929 strongly supports this assumption.

The literature contains several references to the fluctuations of the Schick negative state. It has been shown by Parrish and Okell<sup>11</sup> that natural and artificial immunes may become positive to the Schick test over periods covering from 1 to 7 years. Park<sup>12</sup> has indicated in a study of artificial immunes, over a 5-year period that, although most cases remained negative, some doubtful positive readings were recovered. Dudley<sup>9, 10</sup> has indicated that exposure to diphtherial antigen may develop an immunity. O'Brien<sup>13</sup> has demonstrated in 6 positive cases that the Schick test may act as a secondary stimulus in the production of the Schick negative state. Our findings coupled with the above would seem to indicate that there are many individuals who tend to be borderline reactors, sometime positive, sometime negative, according to the type of influence. The removal of true or subclinical diphtheria as a factor tending to maintain immunity might, therefore, be instrumental in the gradual change from the natural immune to the positive state. This condition would represent the converse of Dudley's hypothesis.

At any rate, it is apparent that we must not only consider the change of reaction of artificial immunes and length of period of artificially conferred immunity, but also the fluctuations of the Schick negative state in so-called natural immunes.

Whether, under the double influence of artificial immunization and the elimination of true or subclinical diphtheria with its action upon borderline reactors, the percentage positiveness of a closed institutional group of this type tends toward a constant figure at any given time, remains to be determined in future studies. In this study, the constancy of the 15 per cent positive figure in 1920 and in 1931 on the same group was striking.

No commentary on the general efficiency of toxin-antitoxin mixture need be made despite the return of many reactors to the positive state. The general condition of the institution after 1920 as compared with the period before speaks for itself.

### SUMMARY

Schick survey results for 1920 have been presented on an institutional group resident over periods ranging from 1895 to 1920, on 1,006 members of the 1920 population resident for 11 years thereafter, and on the population of the institution in 1928 and 1931. It has been shown that the 1920 population was 15.1 per cent positive and that 1,006 patients of this same population resident during the 11 years thereafter were 15.0 per cent positive in 1920, 1.0 per cent positive in 1921 after treatment with toxin-antitoxin mixture and 15.3 per cent positive in 1931. It has also been shown that true or subclinical diphtheria was present as an influence on immunity before 1920 and absent thereafter. Schick results have been presented on 1,006 patients resident at the time of the 1920 survey and during 11 years thereafter indicating that the span of artificially produced immunity runs close to 7 years and that both artificially produced negatives and natural negatives tend to become positive over a given period.

### CONCLUSIONS

1. True or subclinical diphtheria may be a factor in maintaining a high degree of institutional immunity to the disease.
2. The span of artificially produced immunity as measured by the Schick test approximates 7 years, immunized positives returning rapidly to the positive state in the following years.
3. Natural or Schick negative reactors tend to return to the positive state with the elimination of the influence of true or subclinical diphtheria.
4. Administration procedure should include Schick surveys on immunized groups coinciding with the decline in the general level of immunity.
5. Schick surveys at intervals beyond the one over which the protection against diphtheria may be assumed should include original natural negative reactors as well as artificially immunized negative reactors.

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# The Infection of Cows with *B. abortus* Variety of *Brucella* from a Public Health Standpoint

HARRIET LESLIE WILCOX

*Bureau of Laboratories of the Department of Health  
of the City of New York, N. Y.*

NUMEROUS articles have appeared during the last few years on the occurrence of undulant fever in man. The majority of the cases reported have been in the agricultural or cattle raising centers of the middle West and have been traced to the consumption of milk from cows infected with *Brucella* organism or to the handling of infected carcasses.

Investigations, stimulated by these reports, have shown that the infection of cattle is not limited to any one section but is endemic throughout the United States. This has led to further agitation by public health officers to have all milk supplies pasteurized.

The following study was begun in 1930, at which time the Research Laboratory commenced the routine diagnosis of cow serums for *Brucella* infection.

The scope of the work was (1) the examination of the herd, which furnished milk to the tuberculous patients at the Municipal Sanatorium at Otisville, N. Y., for *B. abortus* infection by the agglutination test; (2) the isolation of the organism from the milk of the positive reacting cows and the determination of the variety of *Brucella* found, and (3) the titration of the patients' serums for agglutinins specific for this type.

The serums of 103 cows were examined. Twenty-seven, or 26.2 per cent, showed complete or strong agglutination in a dilution of 1:50.

The milk of 21 of the positive reactors was examined for agglutinins and the *Brucella* organism. Seventeen cows were found to have specific agglutinins, and *Brucella* was isolated from the milk of 13. Data on these cows are given in Table I.

Three cows, C89, C60, and D5, gave histories of having aborted, 1 in 1929 and 2 in 1930. Two, C89 and C60, calved normally subsequently. The third, D5, was with calf when sold in 1931. Cow C31



TABLE I

DATA ON THE POSITIVE REACTORS FROM WHICH *B. abortus* WAS ISOLATED

Cow	Titers of Serum					Titers of Whey*								Date Exam.	Remarks
	C	1/25	1/50	1/100	1/200	C	1/25	1/50	1/100	1/200	1/400	1/800	1/1,600		
B92	-	‡	‡	‡	‡	-	‡	‡	‡	‡	‡	+1	+	4-2-30	Calved normally 1930 & 1931. Sold 12-26-31.
C61	-	‡	‡	‡	‡	-	‡	‡	‡	‡	‡	+1	+	"	Calved normally 9-30-29. Sold July 1930.
J4	-	‡	‡	‡	‡	-	‡	‡	‡	1	1	-	..	"	Calved normally in 1929, 1930 & 1931.
C70	-	‡	‡	‡	+1	-	‡	‡	+1	+1	-	-	..	4-30-30	Calved normally in 1929, 1930 & 1931.
C71	-	‡	‡	‡	‡	-	‡	‡	+1	+	-	..	..	"	Calved normally 1929 & 1931.
C89	-	‡	‡	‡	‡	-	‡	‡	‡	‡	‡	+	-	"	Aborted 4-8-29. Calved normally 1930 & 1931
C41	-	‡	‡	‡	‡	-	‡	+1	+	+	-	..	..	"	Calved normally in 1929 & 1931.
C1	-	‡	‡	‡	‡	-	+1	+	+	-	..	..	..	"	Calved normally 1929 & 1931. Sold.
B54	-	+1	+1	+1	+1	-	‡	‡	+	1	-	..	..	"	Calved normally 1930. Gave birth to sickly calf 1931. Now pregnant.
C31	-	‡	‡	‡	‡	-	‡	-	-	+1	..	..	..	6-27-30	Calved normally 1929. Sterile in 1930. Sold Dec. 1931.
C60	-	‡	‡	‡	‡	-	‡	+1	+	‡	..	..	..	7-23-30	Aborted 1930. Calved normally in 1931.
C93	-	‡	‡	‡	‡	-	+	+1	+1	+1	..	..	..	"	Calved normally 1929 & 1930. Apparently sterile in 1931.
D5	-	‡	‡	‡	‡	-	..	+1	+1	+1	+	‡	..	8-14-30	Aborted 1930. Pregnant when sold in 1931.

\* Quarter showing highest titer given.

† Two quarters gave no whey.

‡ = Complete agglutination.

+1 = Strong agglutination.

+ = 50% agglutination.

= = 25% agglutination.

1 = Trace of agglutination.

- = No agglutination.

.. = Not made.

C = Control.

calved in 1929 but remained sterile in 1930, and C93 was sterile in 1931 though her calving had been normal in 1929 and 1930.

Agglutinin absorption tests showed that the strains belonged to the same serological group. A rabbit was immunized with strain B92, and reciprocal agglutination tests were made with its serum and specific serum for strain 426 \* which Evans<sup>1</sup> classified as belonging to *B. abortus* variety.

The 11 other strains were found to absorb to the same degree the agglutinins from serum 426 as strain B92.

The ability of these strains to absorb the agglutinins in the melitensis serum for its specific strain 428 and for themselves was then

\* This culture was obtained from the National Institute of Health, Washington, D. C.

ascertained. It was found that the cow strains reduced markedly or completely the agglutinins for themselves, whereas the agglutinins for strain 428 were removed only in the higher dilutions.

Theobald Smith and others have stated that it is not possible to differentiate the bovine from the swine strain by agglutinin absorption. Nevertheless the following absorption test was made:

A porcine strain DK obtained from Dr. K. F. Meyer was injected into rabbits to obtain specific serum for this variety. Absorption tests of agglutinins from serum DK and 426 corroborated the statement that *B. abortus suis* and *B. abortus bovine* cannot be differentiated by this method.

TABLE II

THE RECIPROCAL ABSORPTION OF AGGLUTININS BY *B. abortus* 426 AND STRAIN B92

Serum 426 absorbed by 426								
Strain	C	1/40	1/80	1/160	1/320	1/640	1/1280	1/2560
426	-	-	-	-	-	-	-	-
B92	-	-	-	-	-	-	-	-
Serum 426 absorbed by B92								
B92	-	-	-	-	-	-	-	-
426	-	-	-	-	-	-	-	-
Unabsorbed Serum 426								
426	-	#	#	#	#	#	1	-
B92	-	#	#	#	#	#	#	-
Serum B92 absorbed by B92								
B92	-	-	-	-	-	-	-	-
426	-	-	-	-	-	-	-	-
Serum B92 absorbed by 426								
426	-	-	-	-	-	-	-	-
B92	-	-	-	-	-	-	-	-
Unabsorbed Serum B92								
B92	-	#	#	#	#	#	#	+1
426	-	#	#	#	#	#	#	+

# = Complete agglutination.  
 +1 = Strong agglutination.  
 + = 50% agglutination.  
 \* = 25% agglutination.

1 = Trace of agglutination.  
 - = No agglutination.  
 .. = Not made.  
 C = Control.

Huddleson<sup>2</sup> recommends the bacteriostatic effect of certain dyes to differentiate the *B. abortus* suis from *B. abortus* bovine. He has found that basic fuchsin and thionin in specified dilutions will inhibit respectively the porcine and bovine strains. The 13 bovine strains and swine strain DK were therefore plated on liver agar to which basic fuchsin and thionin were added so that the final dilutions of the dyes were 1-25,000 and 1-50,000. Duplicate control plates of liver agar were also inoculated, 1 of which was incubated in ordinary atmosphere and the other with the dye plates under CO<sub>2</sub>. The suspension of the organisms which was used for the inoculum was so standardized that discrete colonies were obtained. The thionin in both dilutions inhibited the growth of the cow strains, but permitted the development of strain DK. The basic fuchsin on the other hand inhibited the porcine strain but did not prevent the growth of the cow strains.

Since the isolation of *B. abortus* bovine by Bang<sup>3</sup> in 1927, numerous writers have emphasized the fact that this organism requires an atmosphere containing carbon dioxide for its isolation on artificial mediums. On the other hand, Smith<sup>4</sup> stated: "All reports on the isolation of the swine strains agree that carbon dioxide sealing is unnecessary from the start." In a later article<sup>5</sup> he said that sealing had a distinct retarding effect upon 3 of the swine strains he studied.

Comparative methods of cultivation under CO<sub>2</sub> and in the ordinary atmosphere were, unfortunately, not used for the isolation of the strains. However, the sensitivity of some of the cultures towards CO<sub>2</sub> was definitely indicated. For example the fishings made from the plates inoculated with milk from cows B92 and C61 were grown aerobically and in CO<sub>2</sub>. In CO<sub>2</sub> growth appeared earlier and was more abundant. Plates inoculated with milk from cow C89 were incubated with and without CO<sub>2</sub>. Growth was obtained only under CO<sub>2</sub>. Tissue cultures from guinea pigs injected with milk from 7 cows, C60, C93, C1, B92, C61, J4, and C89, yielded growth under CO<sub>2</sub>, while similar plantings in the ordinary atmosphere of the incubator remained sterile. An abundant growth was obtained from the spleen of a guinea pig inoculated with milk of cow D5 under CO<sub>2</sub> whereas the cultures grown aerobically showed only a few scattered colonies.

Additional evidence of the favorable effect of CO<sub>2</sub> upon certain strains is shown by the control plates of the dye test. Though 4 strains, C70, C71, C61, and D5, grew well in the ordinary atmosphere when cultured in high dilution, strain C61 had required CO<sub>2</sub> for its isolation from the guinea pig tissue and the growth of D5 had been markedly increased. Three strains, C31, J4, and B54, had produced

larger and more numerous colonies under  $\text{CO}_2$  and 6 strains, C93, C1, C89, B92, and C41, exhibited growth only under  $\text{CO}_2$ . Thus the growth of 11 strains was favorably influenced by  $\text{CO}_2$ .

McAlpine and Slanetz recommend the utilization of glucose as a means of differentiating the porcine and bovine strains. They found that the former used from 4 per cent to 18 per cent of the available sugar as against 2 per cent or less by the bovine cultures. Since the sugar is not fermented in appreciable amounts, these strains produced a larger amount of  $\text{NH}_3$  than the porcine cultures.

Following the procedure advised by these writers, 2 porcine and 8 bovine strains were examined for their utilization of sugar and production of  $\text{NH}_3$ .<sup>\*</sup> It was found that 1 of the porcine strains, 438, used the largest percentage of sugar, but, contrary to the results of McAlpine and Slanetz, it produced the largest amount of  $\text{NH}_3$ . The 8 bovine strains used from 4 per cent to 11 per cent of the available sugar, thus placing them in the porcine group if we accept this method of classification. Meyer and Zobell<sup>7</sup> have subjected 73 strains—33 abortus, 20 melitensis and 19 suis, to this test. They conclude "the quantitative determination failed to demonstrate any appreciable differences in the dextrose utilization."

Through the courtesy of Dr. Louis Cohen, Medical Superintendent at the Municipal Sanatorium, Otisville, N. Y., serum from 223 patients was obtained, representing approximately 65 per cent of the total number in the hospital from March 28 to June 4, 1930, the period in which the examinations were made. Personal objection or condition of the patient prevented the taking of the blood from the remainder.

Four patients were found to be positive reactors and 6 partial reactors. The titrations are shown in Table III.

The history of patient J. S. whose serum agglutinated completely in a dilution of 1-640 is as follows:

J. S., a case of bilateral moderately advanced tuberculosis, admitted November, 1927. No particular complaint until February 15, 1930, when he suffered severe headache, pains in abdomen and painful articulations. This patient, always apyretic before, had a continuous type of temperature ranging around  $101^\circ \text{F}$ . from February 20 to April 9, 1930. This condition left him as suddenly as it appeared. By May 19, 1930, he had apparently recovered but continued to feel weak and was losing weight. The lung condition was about stationary.

This was the only case of those showing agglutinins which manifested symptoms typical of *Brucella* infection. The stool and blood cultures made May 13 and May 22 respectively yielded no *Brucella*

<sup>\*</sup> The determinations were made by Miss McGuire of the Harriman Research Laboratory through the courtesy of its Director, Dr. Falk.

TABLE III  
THE TITERS OF PATIENTS' SERUMS AT THE MUNICIPAL SANATORIUM WHICH SHOWED  
BRUCELLA AGGLUTININS

Titer of Serums								
Name	C	1/25	1/50	1/100	1/200	1/400	1/800	
C.G.	-	#	#	+1	+	±	1	
M.K.	-	#	#	+1	+	1	..	
E.N.	-	#	#	+1	1	-	..	
J.S.	-	#	#	#	±	..	..	
L.S.	-	+1	+	1	-	..	..	
A.D.	-	±	±	1	1	..	..	
G.U.	-	±	1	-	-	..	..	
J.M.	-	+	1	-	-	..	..	
R.B.	-	+	-	-	-	..	..	
M.D.	-	#	#	±	-	..	..	
	C	1/20	1/40	1/80	1/160	1/320	1/640	1/1280
J.S.	-	#	#	#	#	#	#	÷

# = Complete agglutination.  
+1 = Strong agglutination.  
+ = 50% agglutination.  
± = 25% agglutination.

1 = Trace of agglutination.  
- = No agglutination.  
= Not made.  
C = Control.

organisms. The feces were examined according to the procedure of Amoss and Poston.<sup>6</sup> The blood culture was examined weekly for a month. It is possible that a slight infection may have occurred in the other 3 positive reactors which was obscured by the tuberculous condition.

The presence of Brucella agglutinins in the blood serum of man with the absence of clinical signs of infection has been reported by various writers. The following experiment was undertaken to see if rabbits fed with milk containing a live avirulent strain of *B. abortus* as well as a heated suspension of the same organism would produce Brucella agglutinins.

Strain *B. abortus* 426 was used for the feeding. This culture was

grown on liver agar for 48 hours, and after suspension in NaCl was standardized by the Wright method. Half of every suspension was heated to 60°–65° C. for 1 hour, after which sterility tests were made. When the number of organisms had been ascertained, the dead and living suspensions were diluted to the desired number with sterile milk.

Mortality was high from extraneous causes in rabbits receiving both living and dead suspensions. All of the rabbits did not respond by the production of agglutinins. The time of the appearance of these antibodies varied, but as a rule 5 to 6 weeks' feeding was required before the maximum titers were obtained.

Fifteen rabbits were fed dead suspension in the first series. Eight of these died between the 9th and 19th day of feeding, 3 of which showed a slight response. Four rabbits, 101, 120, 425 and 296, though fed for a period of 7 weeks showed no agglutinins. Nedzel and Arnold<sup>7</sup> found that by suspending *B. prodigiosus* in egg white and injecting directly into the duodenum the absorption from the intestinal tract into the blood stream was markedly increased, and concluded that the egg white increased the permeability of the intestinal wall. Rabbits 425 and 296 were given 5 c.c. of egg white before feeding the infected milk for 5 days, but neither responded with agglutinin production. To determine whether these animals were refractory to the artificial stimulation of agglutinins they were given intravenous injections of dead *B. abortus*. The serum of 425 gave complete agglutination in a dilution of 1:1,600, while that of 296 gave a strong reaction in the same titer. Four rabbits, 442, 115, 940, and 315, responded to the feeding by agglutinin production.

Six rabbits were fed the live suspension. Two died the 11th and 16th day without the appearance of agglutinins. Rabbit 118 showed agglutinins on the 18th day of feeding but died 2 days later. Rabbit 258 was fed for 22 days, when feeding was discontinued as no agglutinins had appeared. Rabbit 219 showed a maximum titer on the 34th day when feeding was stopped. The serum of rabbit 609 showed its highest titer on the 30th day. Despite the continued feeding, the titer was not increased.

The serum titers of 3 rabbits in the second series were higher than those in the previous feeding experiment probably due to the larger doses given. Four rabbits were fed dead suspensions, approximately 200 billion daily. The serum of rabbit 501 showed a strong reaction in a dilution of 1:800 on the 17th day of feeding, but died the day following the last bleeding. Rabbits 503, 522, and 523 responded poorly to the feeding and despite the continued inoculations *per os* the titers of their serums decreased.

The serums of 3 rabbits fed the live suspensions exhibited agglutinins in relatively high dilutions. Rabbits 521, 636, and 287 gave strong reactions in dilutions of 1:800, 1:1,600, and 1:6,400 respectively. Under continued feeding the titers of rabbits 521 and 636 were maintained while the agglutinins of rabbit 287 showed a gradual decrease. Tables IV and V give the doses and appearance of agglutinins.

TABLE IV  
AGGLUTININS PRODUCED BY FEEDING *B. abortus*—EXPERIMENT 1

	Rabbit	No. of <i>B. abortus</i> in Billions	No. of Days Fed	Day on which Maximum Titer Was Reached	Dilution of Serums	Percentage of Agglutination
Killed <i>B. abortus</i>	115	*	31	28	1 - 200	100
	315	200	38	33	1 - 200	75
	442	200	14	13	1 - 100	100
	940	200	37	28	1 - 200	75
Living <i>B. abortus</i>	219	†	31	34	1 - 800	75
	609	200	49	30	1 - 800	100

\* Rabbit 115 received 20 million April 10-24  
50 billion May 1-4  
100 billion May 5-8

† Rabbit 219 received 20 million April 10-30  
50 billion May 1-4  
100 billion May 5-12

Since the ingestion of dead and live *Brucella* organisms may result in the production of agglutinins in experimental animals, it is not surprising to find these antibodies in the serums of a small percentage of the patients at the Otisville Sanatorium. Every patient was required to drink daily at least 3 pints of milk, which was raw and came from a herd of which 26 per cent was found to be infected with the *Brucella* organism. The milk of 17, or 80 per cent of the 21 cows whose milk was examined, showed agglutinins in the whey which indicated infection of the udder. That only 1 patient presented evidence of clinical infection emphasizes the low virulence of these strains for man.

TABLE V  
AGGLUTININS PRODUCED BY FEEDING *B. abortus*—EXPERIMENT 2

	Rabbit	No. of <i>B. abortus</i> in Billions	No. of Days Fed	Day on which Maximum Titer Was Reached	Dilutions of Serums	Percentage of Agglutination
Killed <i>B. abortus</i>	501	200	17	17	1 - 800	75
	503	200	52	11	1 - 50	75
	522	200	49	17	1 - 100	75
	523	200	37	12	1 - 50	100
Living <i>B. abortus</i>	636	200	58	27	1 - 1,600	75
	521	200	43	34	1 - 800	100
	287	200	58	33	1 - 6,400	75

## SUMMARY

The serums of 103 cows were examined for *Brucella* agglutinins. Twenty-seven, or 26.2 per cent, showed a complete or strong reaction in a dilution of 1:50 or higher.

The milk of 21 reactors was tested for the presence of agglutinins and *Brucella* organisms. The milk whey of 17 cows showed agglutinins. Of these 7 gave complete or strong reactions in a dilution of 1:200, 5 showed complete or strong reaction in a dilution of 1:50, and 5 showed partial reactions in dilution of 1:25 and 1:50 of the milk whey. The milk of 13 cows yielded *Brucella* organisms.

The 13 strains were found to belong to the bovine variety of *Brucella* by the bacteriostatic action of basic fuchsin and thionin.

Eight strains were tested for their ability to use glucose. All were found to utilize this sugar in amounts that would classify them as porcine strains. One swine strain used as control utilized the largest percentage of sugar and coincidentally produced the largest amount of  $\text{NH}_3$ .

The test for the reciprocal absorption of agglutinins from serums specific for porcine and bovine strains showed that this method could not be used to differentiate them.

The serums of 223 patients who drank milk from this herd were examined for *Brucella* agglutinins. Ten were found to have antibodies in their blood. One, whose serum showed a complete reaction in a dilution of 1:640, gave a history indicative of *Brucella* infection. Three whose serums showed a strong reaction



in a dilution of 1:100 manifested no clinical signs of infection. The serums of 6 showed partial reactions in dilutions of 1:100 or lower.

It has been shown in experimental animals that it is possible to stimulate the production of agglutinins by daily feedings of large numbers of dead and living *B. abortus*.

Abortion occurred in 3 of the 13 cows from which *Brucella* was isolated. Two of the 3 calved normally the following year and 1 gave birth to a sickly calf. Ten cows gave no history of abortion though found to be shedders of *B. abortus*. Two of these animals subsequently became sterile.

### CONCLUSIONS

The milk of cows infected with the bovine variety of *B. abortus* is a potential source of infection for man.

The danger of infection is relatively small when milk contaminated with the bovine variety is considerably diluted.

*Brucella* agglutinins may be present in the blood of man due to the consumption of milk containing *B. abortus*. These antibodies may occur in the absence of clinical symptoms.

Cows in whom abortions have occurred may develop immunity so that they calve normally and still continue to excrete *B. abortus* in their milk.

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## Esthonia Day Nurseries

A RECENT law requires the owners of factories to establish day nurseries close to the factories. The day nurseries are to be open to children under 8 years of age all the year round during the hours of daily work; besides the children whose mothers are employed the day nurseries will also take care of children deprived of mothers but whose fathers or other persons caring for them are employed. Detailed regulations are prescribed for the conduct of these nurseries; a trained staff must be employed.—*Maternita ed Infanzia*, Rome, June 1932, p. 611.

## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

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## ALCOHOL AND INHERITANCE

THE work of Stockard, of Cornell University, in 1913 and 1914, on guinea pigs is well known. Based on a long series of experiments in which guinea pigs were kept alcoholized for different periods, Stockard concluded that the presence of alcohol in the circulation injured the germ plasm and produced permanent deterioration of the race, even though the subjects directly exposed were not injured. He found, however, that by the end of four generations the surviving guinea pigs were of superior quality and lived longer than any others previously known, due to elimination of the weaker and defectives.

This report of the Medical Research Council of England<sup>1</sup> gives details of experiments duplicating those of Stockard which have been carried out with greater care, especially in regard to the genetic qualities of the races used. There were matings between males and females both thoroughly alcoholized for periods of from 1 month to 5 years, and 4 successive generations were treated. Also, there were matings between alcoholized males with normal females, and normal males with alcoholized females. There was only one abnormality among 674 control animals, against 10 among 6,309 of those alcoholized.

The general conclusion was that alcohol has no deleterious effect

on the genetic behavior of guinea pigs. Fertility appeared to be unaffected. Males are no more affected than females. Some evidence indicated that there was a deterioration in weight in the descendants of alcoholized stock. The mortality rate for stillbirths and deaths during the first 3 weeks of life is greater for the offspring of directly alcoholized than of the untreated animals, but the highest mortality among such offspring occurred when the parents had been treated over a period of approximately 2 years. The authors believe that this increased mortality might be accounted for by the age of the parents.

In explaining the difference between their results and those of Stockard, it is suggested that the latter had not adequately controlled the genetic behavior of his stock, and that the results which he attributed to alcohol came about through the introduction of one or more parents with unobserved but inheritable qualities able to bring about the effects seen. It is further suggested that his results may have been influenced by some undetected defect in the diets given his animals; in other words, that the effects were due to alcohol plus a deficiency of vitamins. The experiments now reported do not indicate that alcohol *per se* is capable of producing a transmissible injury to the germ cells.

The experiments were carried out with the utmost care over a period of years, and errors do not appear to have crept in. By the same token, there are few more careful workers than Stockard, and until some explanation is brought forward, it seems impossible to reconcile the directly opposite results obtained by him and by the workers of the Medical Research Council. We must remember also that results similar to those of Stockard have been obtained by Pearl of Johns Hopkins in birds, and by other observers in lower forms of life. The authors of the present report, however, state that their results seem to agree with those of the majority of observers in this field.

The report concludes with a statement that these results should not be used by either prohibitionists or those who advocate the use of alcohol by human beings. The study was a purely scientific one, and the authors decry any application to social affairs. It is unlikely that further experiments along this line will be carried out by them on account of the time and labor required. In this country, with the very strong probability that there will be some modification, if not entire abolition, of our prohibition laws, it will be impossible to keep people from making this application of scientific results. Whether or not they are so applied, scientific people are interested

only in the truth. The report must be considered as a valuable contribution to our knowledge of the subject, though we feel reasonably sure that the conclusions will be attacked in one way or the other.

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## NEW OCCASIONS — NEW DUTIES

LOWELL once said, "New occasions teach new duties: time makes ancient good uncouth." There is a lesson in public health in the utterance.

This is a new occasion. The world is in the throes of a depression made deeper by the heights to which the world rose before. Layman and professional man alike have taken inventory of the changes the new occasion has made about them. They are many and unusual.

Time makes ancient good uncouth. We have advanced with time and the standards of sewage disposal of an ancient day are today unfit. We have built up treatment works that are examples of the engineer's ability to adapt the principles of science to the difficult task of sanitation. The chemical, biological and mechanical devices have stood as bulwarks between the contaminating flow of municipal waste water and the streams which must be kept clean.

As a result, water supplies have functioned under reduced bacterial loads, despite the continued concentration of population in cities. Fish life has returned to haunts long devoid of aquatic life. Bathing and shell fish areas have again become safe for man's external and internal person. The esthetic sense of the nation is no longer shocked by the sight of floating fecal matter and gassing sludge banks.

Comes the new occasion. The depression has caused municipalities to cast frantically about in search of those services which can stand deep appropriation cuts without producing loud protests from the tax payers. Sewage treatment has, somehow, filled these specifications ideally. Out-of-the-way location, lack of information on the part of the citizens—and the officials themselves—have tempted municipalities to reduce operating funds for sewage treatment. Too many sewage treatment works have been crippled by reductions in personnel and appropriations to permit us to disregard the tendency of other economy seekers to follow suit.

There is danger in such a procedure, a danger that strikes the whole public health field because of the close relation between sewage treatment and mass hygiene. The production of a satisfactory

effluent becomes difficult, streams again become contaminated and unsightly, and the lack of proper and intelligent attention results in a costly deterioration of the costly installations.

We cannot forget that the ancient good is uncouth today. We cannot allow a hard earned public health victory to slip away from us. The new occasion, the depression, teaches us new duties. It is for every health worker to understand and make others understand the vital rôle that sewage treatment plays in the nation's health.

*It will be greatly appreciated if members and subscribers will promptly notify the office of the Association of any change of address.*

# ASSOCIATION NEWS

## SOUTHERN BRANCH A.P.H.A.

THE strength of any organization depends largely upon the strength of its constituent elements. Recognizing this fact and recognizing the far reaching interest of any association of public health workers in America, the southern states are developing a Southern Branch of the American Public Health Association under authority conferred by action of the Executive Board. The development has a two-fold objective:

First—The strengthening of southern membership in the American Public Health Association as the representative professional association of public health workers in America.

Second—The exchange of experience and information relative to public health problems more or less peculiar to the South and sub-tropical regions.

Obviously there will be special problems of peculiar interest to the South, and just as obviously a much larger body of workers can be assembled for regional meetings than could be assembled at remote national meetings. An additional advantage, however, is that attendance at national meetings will be stimulated because of increased interest in the Association as a whole,

membership in the parent association being an absolute requirement for membership in the Southern Branch.

The movement was started under very favorable auspices by Dr. Louis I. Dublin, President, at the Tennessee Conference of Public Health Workers last winter. Since that time Tennessee membership in the parent association has been increased from 68 to 162, and at present state health officers in most of the southern states are engaged in stimulating membership for their states.

The first meeting is to be held in Birmingham, Ala., November 14-16, just preceding and conjointly with the Southern Medical Association which itself has a section on public health. In addition, during the same week the National Malaria Committee is meeting, and hence opportunity is afforded to attend three public health programs in the space of one week. The secretaries of these several organizations are working together for development of a program of universal interest with no overlapping. A most successful meeting seems to be in prospect and it is to be hoped that the Southern Branch will be an unqualified success as has been the Western Branch.

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

### *Health Officers Section*

Squire R. Boggess, M.D., Lawrenceburg, Ky.,  
Health Officer

G. S. Brock, M.D., London, Ky., Director,  
Laurel County Health Department

D. G. Caldwell, M.D., Concord, N. C.,  
Cabarrus County Health Officer

George Y. Davis, M.D., 4329 Euclid Blvd.,  
Youngstown, O., County Health Commissioner

Malcolm T. Foster, M.D., Mt. Airy, N. C.,  
Surry County Health Officer

Ollie M. Goodloe, M.D., Federal Bldg., Jackson, Ky., Director, Breathitt County Health Department

Minerva Gordon, M.D., 324 Pennington Ave.,  
Trenton, N. J., licensed Health Officer in  
New Jersey

F. G. Granger, M.D., Dothan, Ala., County  
Health Officer

Arthur M. Johnson, M.D., Health Bureau,  
Rochester, N. Y., Health Officer

Norris C. Knight, M.D., Indianola, Miss.,  
Director, Sunflower County Health Depart-  
ment

Dr. Edward L. McIntosh, Camden, Ala.,  
County Health Officer

Theodore Meyer, M.D., 28 High St., New  
Haven, Conn., Student

Ransley J. Miller, M.D., 909 Kansas Ave.,  
Topeka, Kans., City Health Officer

Charles R. Morton, M.D., Madisonville, Ky.,  
County Health Officer, Hopkins County

Percy L. Querens, M.D., 2703 Napoleon Ave.,  
New Orleans, La., Associate Professor of  
Preventive Medicine, Tulane Post-Graduate  
School of Medicine; Assistant Health Officer

E. T. Riley, M.D., Frenchburg, Ky., Health  
Officer

Louis P. Schubert, 58 S. Main St., Manville,  
N. J., Health Officer

James P. Sharon, M.D., 516 First State Bank  
Bldg., Fort Dodge, Ia., City Physician

Hilton J. Shelley, M.D., 35 South St., Middle-  
town, N. Y., Health Officer

Dr. Charles S. Stern, 7525 W. Greenfield Ave.,  
West Allis, Wis., Commissioner of Health

C. C. Threlkel, M.D., Morgantown, Ky.,  
Director, Butler County Health Department

W. H. Wheeler, M.D., West Liberty, Ky.,  
Director, Morgan County Health Depart-  
ment

#### *Laboratory Section*

LaVerne A. Barnes, Ph.D., 375 South St.,  
Jamaica Plain, Mass., Senior Bacteriologist,  
State Department of Health

Jean Broadhurst, Teachers College, Columbia  
University, New York, N. Y., Professor of  
Bacteriology

Maurice Brodie, M.D., Department of Bac-  
teriology, McGill University, Montreal, Que.,  
Research Worker

George A. Denison, M.D., Box 2591, Board of  
Health, Birmingham, Ala., Director, Bureau  
of Laboratories

William A. Hagan, D.V.M., 320 The Parkway,  
Ithaca, N. Y., Professor of Veterinary  
Bacteriology, Cornell University

N. Paul Hudson, M.D., Ph.D., University of  
Chicago, Chicago, Ill., Professor of Bac-  
teriology

George A. Knaysi, Ph.D., Ithaca, N. Y.,  
Assistant Professor of Bacteriology, Cornell  
University

Benjamin S. Levine, Ph.D., 159 North Dear-  
born St., Chicago, Ill., Director, Clinical  
Laboratory, Public Health Institute

Wade W. Oliver, M.D., 335 Henry St., Brook-  
lyn, N. Y., Professor of Bacteriology and

Immunology, Long Island College of  
Medicine

#### *Vital Statistics Section*

William K. Kirk, 627 Franklin Ave., Steuben-  
ville, O., Manufacturer of Therapeutic  
Appliances (Assoc.)

#### *Public Health Engineering Section*

Daniel J. Adams, Port Norris, N. J., Sanitary  
Inspector

Stanton L. Dorsey, B.S., 791 Arlington Bldg.,  
Washington, D. C., Sanitary Engineer,  
U.S.V.A.

James S. Allen, D.V.M., P. O. 203, Idaho Falls,  
Ida., Milk and Sanitary Inspector

Thomas M. Dugan, 1308 Freemont St.,  
McKeesport, Pa., President, American  
Society of Sanitary Engineers

Walter A. Helbig, B.S. in C.E., Darco Sales  
Corporation, 45 E. 42 St., New York, N. Y.,  
Sanitary Engineer

Paul Molitor, Sr., 4 Willow St., Chatham,  
N. J., Consulting Operating Engineer

George H. Nesbit, 67 Adams St., East Rock-  
away, N. Y., Superintendent of Sewers, West  
Long Beach Sewer District

Milton Spiegel, B.S. in C.E., 4115 Drexel Blvd.,  
Chicago, Ill., Sanitary Engineer, Forest  
Preserve District of Cook County

#### *Industrial Hygiene Section*

John Donnelly, M.D., Mecklenburg Sana-  
torium, Huntersville, N. C., Superintendent

William B. Scull, M.D., Wakeling St. at Oxford  
Pike, Frankford, Pa., Physician for John L.  
Lewis and Bros. Company

Zalton T. Wirtschafter, M.D., 1001 Huron  
Rd., Cleveland, O., Medical Adviser,  
Brotherhood Locomotive Firemen and  
Engineers, Medical Director, Painters Dis-  
trict Council and Medical Consultant,  
Cleveland State Federation of Labor

#### *Food and Nutrition Section*

Raymond C. Bender, Ph.D., Box 212, Bain-  
bridge, N. Y., Nutrition Research Worker,  
Dry Milk Research Laboratories

#### *Child Hygiene Section*

Joseph Grice, M.D., 318 North St., Ports-  
mouth, Va., Medical Inspector Public  
Schools

Dorothy Lottridge, M.D., 43 S. Maple Ave.,  
East Orange, N. J., Director, School Health  
Department

Robert J. Lowrie, M.D., 130 East 56 St., New  
York, N. Y. (Assoc.)

Sven G. Svenson, Swedish General Consulate,  
Buenos Aires, Argentina, S. A. (Assoc.)

*Public Health Education Section*

Charles G. Abell, M.D., Enosburg Falls, Vt.,  
District Health Officer

Samuel Goldstein, 62 Pleasant St., Brookline,  
Mass., Student (Assoc.)

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Railway, Roanoke, Va., Health and Recrea-  
tional Director

Charles E. Shepard, M.D., Stanford University,  
Calif., Director, Men's Student Health  
Service

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Institute, 25 West 43 St., New York, N. Y.,  
Medical Director

*Public Health Nursing Section*

Ruby A. Crawford, R.N., 379 Monroe St.,  
Brooklyn, N. Y., Tuberculosis clinic and  
field nurse

Lillian A. Ford, R.N., 48 Mountain Ave.,  
Maplewood, N. J., Supervisor, Public Health  
Nursing

Ruth W. Hay, B.A., Vanderbilt Univ., Nash-  
ville, Tenn., Assistant Professor, Public  
Health Nursing

Katharine Hitchcock, B.S., Simmons College,  
Boston, Mass., Instructor, School of Public  
Health Nursing

Lou Holladay, Southport, N. C., Public Health  
Nurse

Eileen T. Walker, R.N., 275 Meetinghouse  
Lane, Southampton, L. I., N. Y., Town  
Nurse

*Epidemiology Section*

William R. P. Clark, M.D., 2710 Filbert St.,  
San Francisco, Calif., Member, State Board  
of Health

Carl E. Rice, M.D., Rolla, Mo., Trachoma  
Control, U. S. Public Health Service

## LETTER FROM GREAT BRITAIN

THE STATE OF THE PUBLIC  
HEALTH IN ENGLAND

FROM the returns published in the annual report of Sir George Newman, the Chief Medical Officer of the Ministry of Health, for 1931, it does not appear that the financial crisis and the trade depression have had any very marked effect upon mortality and morbidity rates in England and Wales. The death rate for the year and the infantile mortality rate, it is true, are slightly higher than in the preceding year (12.3 and 66 as against 11.4 and 60), but these variations cannot be regarded as anything out of the way.

Commenting upon the causes of death, Sir George points out that death by injury on roads, etc., today stands among the first seven or eight principal causes of mortality. The death rate of 16 per 100,000 is practically double what it was in 1921.

So far as communicable disease was concerned, 1931 appears to have been not unfavorable. Smallpox (*variola minor*) which had been providing 10,000 to 14,000 cases a year from 1926, gave only 5,664. There was a welcome fall

also in the number of cases of and deaths from the majority of diseases in the group, notably diphtheria, scarlet fever, and tuberculosis. Infectious diseases of the nervous system (poliomyelitis, encephalitis, etc.) were also less prevalent. The number of cases of the former—339 with 63 deaths—was the lowest since 1922.

The fact that the maternal mortality rate continues stubbornly in the neighborhood of 4 per 1,000 live births is noted. Though progress has been made in relation to maternity as well as child welfare work, it is mentioned that economic difficulties have prevented some of the expansion and development that it had been hoped might take place following the work and reports of the Maternal Mortality Committee.

In relation to schemes affecting tuberculosis, venereal disease, and cancer, the reports offer reasons for belief that there has been progress also. Greater use has been made of the facilities provided for diagnosis and treatment in the case of the first two particularly, and reference is made to a number of interesting and practical investigations into the treat-



ment of tuberculosis and the causation of cancer.

#### THE "SEMBLANCE OF INCREASE" IN HEART DISEASE MORTALITY

IN the section dealing with cancer a careful and convincing analysis is made of the cancer statistics with the object of backing up a warning against too readily accepting the growing figures for the crude mortality rate from cancer as evidence of a marked increase in the fatality of the disease.

Rheumatic diseases, to which growing attention has been given during the last few years, have a section entirely to themselves. Acute rheumatism, it is noted, affords "one of the major opportunities of preventive medicine, the fleeting opportunity to prevent organic heart disease." This opportunity some of the great cities have seized while others hang back. The mortality ascribed to rheumatic fever continued to fall, the rate now being less than half that of 1901.

As regards heart disease, the statement of the Registrar-General made in 1928 is repeated that the "semblance of increase" in heart disease mortality is largely fictitious, being due to the increasing age of the population and the change in the practice of death certification which makes much more frequent record of degenerative changes in the heart muscle than was customary a few years ago. In the younger age groups in which rheumatism is a main factor, mortality from heart disease shows a considerable reduction.

#### A HEALTH EDUCATION CONFERENCE

THE Society of Medical Officers of Health appears to be one of the few bodies in this country that does not arrange for an annual conference on its own account. To some extent, no doubt, this is due to the fact that other bodies, notably the Royal Sanitary Institute and

the British Medical Association, at their annual meetings provide facilities for medical officers to confer or for discussions on subjects in which they are interested. The nearest that the society gets to arranging meetings of the type of the annual conference is in connection with a body known as the Central Council for Health Education, which owes its existence to the society and, containing a large representation from it, lives and moves and has a great part of its being in the house of the society.

The objects of the Council, which to a very large extent it secures, are to bring together the various voluntary organizations engaged in health education and to make contact between the organizations and authorities and others who may require their services. The annual conference is held partly in order to advertise the Council, and partly to give the bodies brought together as a result an opportunity of getting together. Recognition is in general given by the Ministry of Health, and health authorities and organizations in sizeable numbers accept the invitation to attend the meeting.

The conference this year is the fifth of the series and is to be held at the London School of Hygiene and Tropical Medicine on November 17. The Minister of Health (Sir E. Hilton Young) has promised to preside and will deliver an address. At the morning session the subject for discussion is "The Churches and the People's Health," to be opened by two representative clergymen of whom the Very Reverend W. R. Inge ("The Gloomy Dean") will be one. In the afternoon, representatives of voluntary health organizations and others will put up a discussion on "The Positive in Health Education." As the phrases "A positive health policy" and "The need for positive health teaching" have been bandied about a good deal of late in certain health propaganda society circles, the opportunity of

talking on this subject will receive wide and ready acceptance.

#### THE INSURANCE MEDICAL SERVICE

DISCUSSING the work of the insurance medical service, Sir George Newman puts the cost of medical benefit, exclusive of the cost of administration, at £9,497,616, of which over 7 millions sterling was expended in the remuneration of medical practitioners, and about 2½ millions in the supply of medicines and appliances. The amount of time lost by insured persons on account of sickness amounted to 26½ million weeks (509,615 years) or an equivalent of 12 months' work of about 510,000 persons.

The fact of the steady increase in claims for benefit and the causes thereof are discussed at some length. With a view to insuring exercise of greater care in connection with the issue of certificates by insurance physicians, a staff of regional medical officers has been appointed. Though it has only been at work a comparatively short time this staff has already succeeded in securing great improvements in the standard of certification in a number of areas.

In spite of difficulties such as these, that there has been real benefit to the workers as a result of the operation of national health insurance Sir George Newman has no difficulty in showing. More important still, he finds himself able to prove that as a result of the efforts of the practitioners undertaking insurance work—approximately 70 per cent of the registered medical practitioners in England and Wales—much progress in the direction of prevention has been and is being made.

The total number of insured persons is about 16 millions and for these provision is made under the system for securing the two essentials of all preventive medicine—the early clinical

diagnosis of sickness and the ascertainment of its causation.

#### THE COST OF PUBLIC HEALTH WORK

APART from his examination of the cost of the insurance service, Sir George Newman submits figures showing the cost of public health work generally in England and Wales and discusses as to whether or not the expenditure is justified and whether or not the justification is sufficient to warrant its continuance.

The annual expenditure on all public health works totals £57,370,000 (about 200 million dollars). This covers everything, including housing, water supply, sewage and refuse disposal, etc., but excludes voluntary funds and resources, expenditure on institutions for the insane, etc. In the list of what is secured for the money there are probably several items that the determined economist would mark as unnecessary. If he will study the report, however, and recognize what the information given means and, particularly, if he will compare what is spent on health with what goes in other ways, on education for example, or amusements, or alcohol, or tobacco, he must conclude that the money is well spent. He will understand also just why the Government, acting on the advice of the Minister of Health that it was not economy, it was waste, to fail to maintain the nation's health, has determined that the essential health services shall be continued unimpaired.

Sir George Newman's "State of the Public Health" for 1931 is an attractive and inspiring volume, and though, naturally, it will interest most intimately health workers here, as always, its appeal will be international and to workers in the field of preventive medicine generally.

CHARLES PORTER, M.D.

London

# PUBLIC HEALTH ADMINISTRATION

**Smallpox Types**—The mild form of smallpox commonly designated by its Portuguese name, *alastrim*, has prevailed over vast regions of the United States for over 30 years. It is estimated that the germ of this disease must have been transmitted from one human being to another more than 800 times and yet it is bred true. Throughout all these "generations" the organism maintains its early characteristics.

Cases of this mild strain of smallpox, like those of most contagious diseases, exhibit many minor variations, but without the development of a permanent new type. These variations are of the fluctuating type. No evidence has been found that the mild strain has ever reverted to the classical type, that is, that the pathogen of the disease has ever undergone a mutation in that direction. While it is true that there have occurred in the United States many outbreaks of severe classical smallpox, the cases have been most numerous near the Mexican border and at seaports. A large number of these outbreaks of the severer strain have been definitely shown to have arisen from outside the borders of the United States. Most American health officers and epidemiologists who have had experience with the two types of smallpox do not believe that as yet there has been any reversion of the mild strain to the old classical strain.—Charles V. Chapin and Joseph Smith, *Permanency of the Mild Type of Smallpox*, *J. Prev. Med.*, 6:273 (July), 1932.

**Poliomyelitis in New York**—During the epidemic which occurred in upstate New York in 1931 there were 2,020 cases of poliomyelitis. While the peak of the epidemic for New York City occurred in the first week of August, in

the remainder of the state the high point was not reached until the first and third weeks of September. Of all the upstate cases 77 per cent occurred in 16 counties which lie along the Hudson River valley and in that part of Long Island outside of New York City. These counties contain only 36 per cent of the upstate population. The three counties immediately adjacent to New York City, Nassau, Suffolk, and Westchester were responsible for 43 per cent of the entire number in the outbreak.

Of the total cases reported 57 per cent were diagnosed and reported before the occurrence of paralysis. In the 1916 epidemic there were 901 deaths among 4,215 reported cases, a fatality rate of 21.4 per cent. In the year 1931 there were reported 2,051 cases with 164 deaths, a fatality rate of 8 per cent.

The author suggests that any one of several factors or a combination of such factors may have been responsible for the decrease in the fatality rate: (1) The virus may have been less virulent. (2) The earlier diagnosis and better general medical and nursing care and the large use of hospital treatment may have been responsible. (3) The use of serum may have produced the more favorable result.

More than 140,000 c.c. of serum was collected from persons who had previously suffered from poliomyelitis and was made available through consulting physicians to every area in the state. Serum was rather extensively used and consequently no adequate control series is available. The fatality rate for the group whose condition was diagnosed in the preparalytic stage was 3.5 per cent. No conclusions have been reached with regard to the efficacy of the human convalescent serum which was used so

extensively that only 73 patients out of a total of 1,559 did not receive the serum.—F. W. Laidlaw, *Poliomyelitis in the State of New York in 1931*, *J.A.M.A.*, 99: 1053 (Sept. 24), 1932.

Baltimore—The general death rate in Baltimore in 1931 was 14.16, slightly higher than that for 1930 but with this one exception the lowest death rate since 1921. The infant mortality rate was 74.5. The Health Department suffered a reduction in its appropriation for 1932 of 20 per cent over the 1931 budget allowance. This required the laying off of 93 members of the staff. There were immunized against diphtheria 16,239 children of which number 6,400 were treated in the preschool clinics, 7,839 in the school clinics and

2,000 by private physicians. There were reported 416 cases of diphtheria with 23 deaths, a death rate of 2.8 per 100,000 population.

There is reproduced in this report a copy of an abstract of the bill of mortality for the city of Baltimore for the year 1815. In that year there were 1,349 deaths. Consumption was the most important cause with 218 deaths. This was followed by cholera morbus with 167 deaths; 108 deaths from pleurisy and 98 deaths from fits. It is of interest to note that there were only 3 cancer deaths recorded, 1 death from hives, 9 deaths from teething, and 75 deaths from worms. "Sudden" death accounted for 9 and "mortification" was responsible for 5 deaths.—*Annual Report*, Baltimore Dept. of Health, 1931.

## LABORATORY

### AN ACCURATE METHOD OF READING THE KAHN REACTION

HENRY C. READ, JR.

*Read Pathological Laboratory, Fort Smith, Ark.*

ONE of the most important steps in the technic of the Kahn reaction for syphilis is the correct reading of weak positives. I have overcome this difficulty in our laboratory by means of the following apparatus. A small compound microscope (shown in Figures I and II) manufactured by Bausch and Lomb Optical Company, and known as the "Little Gem," is used. The base of the microscope carrying the mirror is detached. A small electric light with carbon filament is encased in a metal box with daylight filter. The box is made fast to the underneath side of the stage by means of screws. A rack made of copper wire, to hold one Kahn tube, is

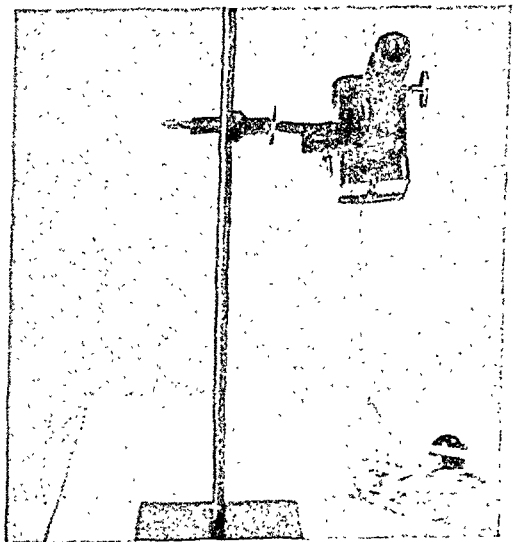


Figure I—Front View

attached to the stage in such a manner as to be between the objective and the source of light. The whole is then mounted on a stand and the microscope tipped nearly to the horizontal. The source of light is just close enough to the tube to allow the small amount of heat radiated to keep the floccules in motion, and produce a boiling appearance. Thus it is very easy to distinguish between floccules and artifacts in the glass tube when focusing the microscope for reading.

The negative reactions show no flocculation. However, there may be an occasional dust particle or other piece of debris present. With a little experience these can be distinguished easily from the true floccules, for the former are rather large in size, approaching black in color and with rather even edges.

The one plus reactions take on the appearance of many minute individual grains of sand. In the two plus reactions the grains of sand seem to have banded together making them appear much larger than in the one plus. The three and four plus reactions can be read

with ease without the aid of the microscope, because of the heavy flocculation. Under the microscope the floccules take on a leafy appearance.

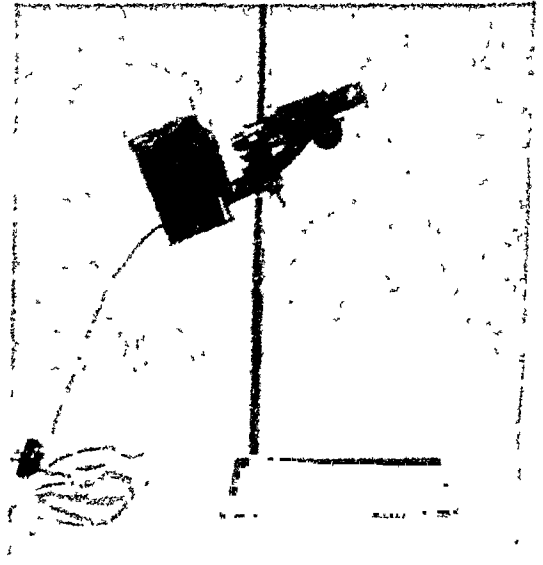


Figure II  
Side View. Note proximity of tube to light.

The advantages gained from reading Kahn reactions by this method are: (1) The weak positive results are brought out more clearly, and (2) there is a constant intensity of light, thus reducing a variable factor and making it feasible to read reactions at night.

## VITAL STATISTICS

Comparison of Vital Statistics for Tasmania in 1930—The birth rate per 1,000 population in Tasmania was 22.10 for the year 1930, which was practically as low as it has ever been, and compares with an average rate of 24.83 per 1,000 for the decade 1920–1929. The average rate for the 3 years 1919–1921—10 years before—was 26.73 per 1,000.

During 1930 there were 1,948 deaths registered, as compared with 2,176 in 1929, which is the lowest number recorded since 1926. The improvement was chiefly in the rural districts where there were 195 fewer deaths in 1930

than in the previous year. In the urban areas also there was a small net decrease of 33 deaths. The general death rate per 1,000 persons for Tasmania in 1930, 9.00, is the lowest ever recorded for Tasmania. The death rate in 1929 was 10.18. This rate was abnormally high; consequently there is little gratification in using the year 1929 for comparison with the more favorable results in 1930. A more valid comparison is obtained by taking, as a basis of comparison, the results for the previous decade. During the decade 1920–1929 the average number of deaths each year

was 2,074, the death rate being 9.75 per 1,000 persons living, whereas, during 1930 the number of deaths was reduced to 1,948—a rate of 9.00 per 1,000.

The number of deaths under 1 year of age (242) was smaller in 1930 than in any other year, except in 1926 when it was 232. When taken in relation to the number of births subject to the risk of death the rate per 1,000 was 50.6 in 1930, against the best rate of 46.5 per 1,000 in 1926. The average rate for the 10-year period 1920–1929 was 58.6. During 1930 there were 155 stillbirths registered, representing 3.1 per cent of all births, compared with a decennial average (1920–1929) of 3.0 per cent.

The number of marriages registered during 1930 was 1,450 against 1,712 in 1929 and 1,499 in 1928. The marriage rate per 1,000 persons, which had been increasing from 6.79 in 1926 to 6.82 in 1927, 7.07 in 1928, and 8.02 in 1929, declined in 1930 to 6.71, which is the lowest marriage rate recorded since 1918, when the rate was 5.71.—*Statistics of the State of Tasmania*. Commonwealth Bureau of Census and Statistics, 1930–1931, pp. 11–13.

**Vital Statistics of Egypt**—Egypt, in spite of the invasions it has experienced throughout the ages, shows in certain elements of its population a really remarkable racial purity for the last 6,000 years or so. The Copts of Upper Egypt are, indeed, the direct descendants of the ancient Egyptians as the tombs and paintings of the age of the Pharaohs reveal them to us. Their religion, respected by the Mohammedan conquerors of the country (in the 7th century), has enabled them to keep all their racial characteristics by preventing their fusion with the Arabic elements, which have been specially important in number since the 11th century.

The numbering of the population probably dates back farther in Egypt than in any other country, since the ear-

liest enumeration took place under the most ancient Pharaonic dynasties. Under Amasis II, before the Persian conquest, the population was numbered every year. Unfortunately, the sequence was broken, and in modern times the first computation of the population was made during the French expedition in 1800, when the population was 2,460,200. Other estimates followed in 1821, 1846, and 1873, but it was only in 1882 that a census, as understood nowadays, was carried out. At this time, the population of Egypt numbered 6,831,131.

In addition to the settled population, the Egyptian censuses cover a nomadic Bedouin population whose number is known only approximately (97,381 in 1882, 32,663 in 1917 and 35,500 in 1927).

At the 1927 census, the settled population was distributed as follows: according to nationality—Egyptians 13,952,264, foreigners 225,600; according to religion—Mohammedans 12,929,260, Christians 1,181,910 (including 946,393 Copts), Jews 63,550, other religions 3,144; and according to sex—7,058,073 men and 7,119,791 women. This excess of females is particularly remarkable in a country with a Mohammedan majority (99 men for 100 women).

The registration of births and deaths, practised by health officers and mayors since 1846, became compulsory in 1891. The obligation was then extended to foreigners on August 11, 1912. Births must be recorded within a fortnight. The birth rate is high, varying between 40 and 45 per 1,000 inhabitants (43.7 per 1,000 in 1929). The general mortality is also high, varying between 25 and 29 per 1,000 (27.3 per 1,000 in 1929). The average excess of births over deaths is about 17 per 1,000 (16.4 per 1,000 in 1929).

The increase would be still higher if the infant mortality were not so very high. From 1919 to 1929, it varied between 128 and 159 per 1,000 births.

Nevertheless, these figures are probably inferior to the actual numbers, as certain deaths of female infants occurring in the country escape registration. The infant mortality is markedly higher in the large towns. Among the native population of Cairo, it averaged 289 per 1,000 during the period 1915-1919 and 232 per 1,000 during the period 1925-1929.—League of Nations. *Monthly Epidemiological Report*, the Health Section of the Secretariat, 5-6:10-11 (May-June), 1932.

**Vital Statistics for Germany, 1931**—According to a report from the federal bureau of health, the live births in Germany for the year 1931 show a decrease of about 96,000 over 1930. This decrease is significant particularly in view of the steady decline in births which has been going on in recent years. To each 1,000 women of child-bearing age there were, in 1913, 116.5 living births; in 1930, 67.2; and in 1931, 61.8. According to statistics for the first quarter of 1932, the decline in the birth rate is continuing. In contrast with the previous years, the decline in births for 1931 was most marked in the communities with less than 15,000 inhabitants.

The number of deaths in 1931 showed an increase of 15,000, notwithstanding the fact that the reduction in births led one to anticipate a decrease of about 8,650 deaths. The infant mortality for 1931 was 0.1 below that of 1930. There are as yet no federal statistics on the chief causes of death in the year 1931. The Prussian statistics, however, which extend through the third quarter of 1931, give information on the more important causes of death, and especially on the increase of mortality in the first quarter of 1931. This increase was caused chiefly by the prevalence of influenza and disorders of the respiratory and circulatory organs.

Aside from the increase in the number of cancer cases due to the greater aver-

age age of the population, the mortality figures for 1931 were not unfavorable. There was a marked decline in the mortality from acute infectious diseases, including puerperal fever, diseases of the digestive tract, accidents and, to a slight extent, from tuberculosis. The suicide rate showed a slight increase.—*J. A. M. A.*, 99:402-403 (July 30), 1932.

**Unprecedented Rise in the Cancer Death Rate**—While health conditions in general have been extremely favorable during the last 2 years, the death rate from cancer has been rising sharply. This is one of the very few unfavorable developments in the public health in recent years.

It is true that, for a long period of years, the cancer death rate, both among the many millions of policy holders of the Metropolitan Life Insurance Company and the general population of the country, has been increasing. But the rise has been slow in each group. During the 12-year period 1919 to 1930 the difference between the minimum crude death rate for the insured (67.0 per 100,000—registered in 1919) and the maximum (79.5—registered in 1930), was 18.7 per cent. In strong contrast with this relatively slow average rise of almost 1.5 per cent per annum in the death rate, there is shown at the end of 1931, a 7.4 per cent rise in a single year; and reports for the first half of 1932 show a further rise of 9.5 per cent over the rate for the like part of last year. If deaths from cancer continue to occur at the present rate throughout 1932, the cancer death rate among Metropolitan Industrial policy holders will have increased more than three-fourths as much, in 2 years, as it did in the preceding 12 years back to 1919.

It cannot be determined at present whether the cancer mortality rate rose as sharply in 1931, among the population at large, as it did among insured

wage earners and their dependents. Unfortunately, only fragmentary and inconclusive mortality data for 1931 are, as yet, available from official sources. Nevertheless, the few reports that have been received strongly suggest that cancer deaths increased last year in the country at large, to an extent that has not been heretofore observed in any single year—although the rise was not as marked as among the working classes. According to provisional mortality reports from the States of New York and New Jersey, the cancer mortality rate in 1931 increased 5.8 per cent and 6.4 per cent respectively in these two states, which comprise approximately one-seventh of the population of the country. Scattered reports from cities show per cent increases of 11.7, 9.1, 5.8, 4.3 and 2.9 in San Diego, Syracuse, Philadelphia, Birmingham and Rochester, respectively. On the other hand only average rises are shown in the States of Indiana and Wisconsin and the cities of New York and New Haven; and small declines were registered in Rhode Island and in Buffalo, Detroit and Milwaukee.

The weight of the evidence is that the cancer death toll is now increasing at a very rapid rate. It has been suggested that the unusual increase, among Metropolitan Industrial policy holders, may have been due, in part, to a change during 1931 and 1932 in the relative age distribution of lives exposed to risk, whereby a considerably larger proportion of the policy holders is now in those age ranges where cancer mortality is the highest. This thesis is not tenable, however. The facts of age distribution among the policy holders show no marked shift. Again, when the 1930 and 1931 cancer death rates are standardized for age, a large increase in the rate is found. Furthermore, no such marked increase in the death rate has been observed in the mortality from cardiac disease, chronic nephritis and cerebral hemorrhage, all of which, like

cancer, are diseases of the older ages. The heart disease death rate among the insured rose only 2.1 per cent in 1931 (as compared with 7.4 per cent for cancer), while that for cerebral hemorrhage was unchanged and that for chronic nephritis dropped 1.6 per cent.

In conclusion, some forces must have been at work since the beginning of 1931 to cause a marked acceleration in the number of deaths reported from cancer. It is by no means assured, as yet, that the actual increase in 1931 and 1932 has been as sharp as the figures indicate. There is always the possibility that part of the rise resulted from more accurate diagnoses. An eminent authority on cancer believes this to be true. Many more cases are undoubtedly being discovered through laboratory findings, operative procedures and autopsies, which are being made more often now than ever before.—*Stat. Bull.*, Metropolitan Life Insurance Co., 13:4-6 (July), 1932.

**Population Analysis by Place of Birth for the Dominion of Canada, 1931**—The census of 1931 gave a population of 10,376,786 for Canada as against 8,787,949 in 1921. This represented a 10-year increase of 1,588,837 or 18.08 per cent for the last census over the previous one. The census of 1921 gave an increase of 1,581,840, or 21.95 per cent, over the 1911 census. Of the total increase in population, shown by the last census, 1,236,511, or 77.8 per cent, was contributed by the native born, 119,298 or 7.6 per cent by persons born elsewhere in the Empire, and 232,416, or 14.6 per cent, born in foreign countries.

The per cent distribution of the population according to birth place, at each census during the past 40 years was as follows: in 1881 in a total population of 4,324,810 the native born comprised 86.06 per cent, the British born 11.07 per cent, and the alien born 2.87 per



cent. In 1891 in a population of 4,833,-239 the native born comprised 86.68 per cent, the British born 10.15 per cent, and the alien born 3.17 per cent. In 1901 in a population of 5,371,315 the native born made up 86.98 per cent of the total, the British born 7.84 per cent, and the alien born 5.18 per cent. In 1911 in a population of 7,206,643 the native born comprised 77.98 per cent, the British born 11.58 per cent, and the alien born 10.44 per cent. In 1921 in a total population of 8,788,483, the native born comprised 77.75 per cent, the British born 12.12 per cent, and the alien born 10.13 per cent; while in 1931 in a total population of 10,376,786, the native born population comprised 77.76 per cent of the total, the British born 11.41 per cent, and the alien born 10.83 per cent.

In 1931, the native born constituted 77.76 per cent of the total population of Canada as against 77.75 per cent in 1921; 77.98 per cent in 1911. In 1901 before the provinces of Saskatchewan and Alberta were organized the native born comprised 86.98 per cent of the total population of Canada. According

to the last census persons born within the Empire made up 89.18 per cent of the population as against 89.87 per cent in 1921, and 89.56 per cent in 1911. The slight decrease in the proportion of the Canadian and British born shown by the last census as compared with previous ones is attributable largely to the increase shown by the European section of the "foreign born" which advanced from a proportion of 5.23 per cent in 1921 to 6.88 per cent in 1931. The most significant decrease in the foreign born was registered for the United States born, which fell from a total of 374,022 in 1921 to 344,574 in 1931. At the last census they comprised only 3.32 per cent of the total population as compared with 4.25 per cent in 1921, and 4.21 per cent in 1911. The classifications of the foreign born population according to birth places, so far as they relate to European stocks, are based on post-war political boundaries in the last census, as well as in the previous one.—Dominion Bureau of Statistics, *Birthplaces by Sex for Canada and Provinces*, 1931, pp. 1-3. *Census Bull.* 15.

## PUBLIC HEALTH ENGINEERING

### CITY OF BRADFORD WORKS OF SEWAGE DISPOSAL

1790-1930

THIS is a pamphlet issued in 1931 (3rd ed., 92 pp.) by the Sewage Department of the City of Bradford, by its Chief Engineer, H. Wontner-Smith, describing the history, construction and operation of the Sewage Disposal Works of the City of Bradford, England. Bradford for years has been the center of the wool combing industry in England, and thereby has been confronted with the problem of handling a large amount of waste.

After various trials of precipitants, in January, 1901, sulphuric acid was used and it was found that the sludge could be filter-pressed and the grease extracted. Both grease and dried sludge cake are marketable.

The main works at Esholt serve a drainage area of 20,156 acres and a population of 273,000 people. There is also a smaller works at North Bierley, serving 3,532 acres and 23,500 people. The flow at Esholt is 63 Imperial gallons

per head per day. The average flow is 23.75 million Imperial gallons per day. There is a wide fluctuation in the hourly flow because of industry. Sewage entering the works is one-half domestic and one-half wastes, the latter consisting of wool scouring effluents and dye liquors. The former are very strong in grease and suspended matter. The yearly average analysis of the sewage handled shows in parts per million: Grease 890, Suspended matter 1,450, Oxygen absorbed 246, and Alkalinity 815.

The sewage comes to the works through a tunnel and is put through a grit catching device, is then acidified with sulphuric acid and passed through a mixing tank to two series of precipitation tanks, one containing 20 units for the acid cracking process; and the other 20 units for secondary precipitation. The tank effluent is passed through 53 acres of bacterial filters built up with coal. The sludges are screened, then pumped to the sludge disposal building, where it is treated for the extraction of grease and water. The methods of working are discussed at considerable length.

At the present time some 12,000 to 13,000 tons of acid are used per year. The sludge is held about 3 months in the tanks, arriving in the filter presses with approximately 80 per cent moisture. The acid is made by the City of Bradford, partly at the plant and partly at its gas works. The bacterial filters are made of coal, from  $\frac{3}{4}$ " to  $1\frac{1}{4}$ " in size. At the time of the general strike in 1926, some 200,000 tons were sold and afterwards replaced. Rectangular traveling distributors are used, drawn by wire ropes.

The sludge treatment is of particular interest. The sludge is heated in 7-ton vats by steam coils to 170° F. It is then forced by ejectors to 128 presses in the press house and is filter-pressed through cotton cloths by alternately feeding heated sludge and super-heated

steam to keep up the temperature. Liquid and grease are discharged in the process. About 40,000 cotton filter press cloths are used annually. A cloth lasts from 6 to 8 weeks. Ordinarily, the pressing takes 64 hours, the grease content being reduced in the dry solids from 40 per cent in the original sludge to 16 per cent; the water content being lowered to 26 per cent. The pressed cake is removed to an open air drying area, where it is kept in heaps for 12 months. This reduces the grease content by the "heating" of the material. The sludge is sold. Although various experiments have been carried on with activated sludge and sludge digestion, the present process is the one favored.

Construction of the works is described in detail and interesting data are given on the business side of the undertaking. The works have cost about £1,910,000.

During the war the sale of grease was remunerative, bringing in an income in 1918 of £126,658 sterling. In the first 12 years of the post-war period the sales produced over a half-million pounds sterling. In the years 1920 to 1930 the sale of the sludge brought in an additional total of £40,000. The sludge is also ground to powder, mixed with coal and used for stoking the boilers. The report states that the cost of sludge disposal and pressing (at present around £35,000 per annum) is more than covered by the sales in recovery of grease and manure, but that this revenue does not cover the cost of the whole treatment.

The pamphlet closes with an interesting description of the old Esholt estate, which dates back to 1086. The present offices of the department are in a very interesting and well preserved building, which is of historical interest. The entire estate, comprising 1,700 acres, was purchased, including the village and other lands beside those utilized directly for the sewage treatment.

LANGDON PEARSE

## FOOD AND NUTRITION

**Antirachitic Value of Milk from Cows Fed Irradiated Yeast**—Several workers have reported positive antirachitic properties in the milk from cows fed irradiated yeast if there is incorporated 30,000 to 60,000 vitamin D rat units per day in the yeast. Arrangements were made by the authors to secure "yeast milk" from a herd of 9 cows fed, in addition to the ration, 60,000 rat units as irradiated yeast daily.

This milk was fed to 4 human subjects—2 male infants, aged 16 and 8 months respectively, and 2 female children, 4 years, 11 months, and 3 years, 2 months, respectively, all of whom had definite active rickets as evidenced by roentgenograms. The milk was pasteurized for 3 of the patients and for the 4th it was in addition boiled for 5 minutes. Clinical records of these 4 showed definite progress toward healing of the rickets.

Analyses of the serum-calcium and serum-phosphorus show an increase in the former and a marked increase in the latter after the addition of the special milk. Deposition of bone as shown by roentgenograms was established after 2 weeks on the special milk diet. It has been stated by Howland and Kramer (*Tr. Am. Pediat. Soc.* 34: 204, 1922) that the determining factor in calcification of bones is a figure between 30 and 40, representing the product of the concentration of calcium and phosphorus in milligrams per 100 c.c. of serum. At the beginning of the feeding period the concentration in all cases was definitely under 30, and at the end of the period it varied from 58.8 to 69.4. The authors conclude that there is calcium deposit in the concentration of 30 but that the concen-

tration which permits complete calcification depends upon the rate of growth of the individual.

The opinion is advanced that the administration of antirachitic vitamin in the form of yeast milk is preferable to adding it to food as a therapeutic agent. After 5 minutes' boiling the milk still possessed antirachitic properties.—Edwin T. Wyman and Allan M. Butler, *Am. J. Dis. Child.*, 43:1509 (June), 1932.

**Seasonal Variation in Antirachitic Action of Arkansas Sunshine**—Biologic determinations of the antirachitic action of sunshine have been made a Little Rock at all times of the year with large groups of animals under carefully controlled conditions. The average daily amount of sunshine necessary to afford the same partial protection against rickets in rats receiving a rachitic diet varied from 5 minutes in May, June, and July to 168 minutes in December, with intermediate values for the other months.—Paul L. Day, *Am. J. Dis. Child.*, 43:1455 (June), 1932.

**The Effect of a High Intake of Manganese on the Growth of Rats**—This investigation was made on rats before weaning and after weaning. The basal ration used throughout the experiment was that described by Waddell & Steenbock (*J. Biol. Chem.*, 80:431, 1926), and contained 13.4 mg. of manganese per kilo. Female rats which received 10 mg. of manganese per day above that in the stock ration (13.4 mg. per kilo) were as successful in rearing their young as females receiving the stock ration only.

The addition of  $\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$  equiv-

alent to 2,000 p.p.m. of ration did not retard the growth of rats over a period of 12 weeks immediately following weaning. Therefore, the slower growth of rats on a modified ration containing added manganese, reported in a previous publication (*J. Biol. Chem.* 90: 65, 1931), was not due to toxicity of this element but to a less suitable source of milk solids.—J. T. Skinner, *J. Nutrition*, 5:451 (Sept.), 1932.

**The Effect of Figs and Small Amounts of Raisins on Urinary Acidity**—In a previous experiment (*J. Nutrition*, 5:103, 1932), the effect of fresh Malaga grapes, several kinds of grape juices, grape concentrates and 2 varieties of raisins on the urinary acidity was shown. This experiment was undertaken on male subjects to ascertain the effect of raisins and figs. Thompson Seedless raisins and Calimyrna white figs were used. The experiment were of 11 to 12 days' duration.

Each experiment was divided into two periods. For the first 5 days each person received only the basal ration; during the next 6 or 7 days each person received, in addition to the basal ration, a constant quantity of raisins or figs. When the raisins or figs were added to the basal diet, the following results were observed:

A ration of 105 gm. of raisins in bread produced 50 per cent to 60 per cent as great an increase in the pH of the urine as did 300 gm. of raisins. The increase produced by the 105 gm. ranged from 0.45 to 0.60 pH units. Three hundred gm. of figs produced an increase in the pH of the urine ranging from 0.9 to 1.1 pH units. This change was slightly greater than that produced by an equal weight of raisins.

A decrease in the ammonia excreted with a corresponding decrease in the total acidity was noted. The 300 gm. of figs produced a greater decrease than 105 gm. of raisins and also a slightly

greater decrease than an equal weight (300 gm.) of raisins.

There was an increase of the alkaline reserve above the normal for each subject, the greater increase being produced by the figs.

A correlation between the alkalinity of the ash and the physiological reaction was apparent. A more basic body reaction was associated with higher alkalinity of the ash.

The organic acids from 105 gm. of raisins daily were completely oxidized by the body, whereas those from 300 gm. were only 99.8 per cent oxidized. However, the organic acids from 300 gm. of figs were oxidized to the extent of 97.5 per cent.—Lawrence G. Saywell, *J. Nutrition*, 5:519 (Sept.), 1932.

**The Administration of Ferrous Iodide and Linoleic Acid to Rats Deprived of Vitamin A**—Male rats, weighing 38 to 50 gm. at 21 days of age, were given *ad libitum* a diet consisting of extracted casein 70 per cent, starch 20 per cent, yeast 5 per cent, salt mixture 4 per cent, and sodium chloride 1 per cent. This diet was supplemented daily with 0.001 mg. of irradiated ergosterol dissolved in oil. When the rats ceased to grow and developed severe xerophthalmia, which occurred in about 40 days, they were divided into 5 groups which received, respectively, daily supplements of 0.1 c.c. distilled water; 1 drop cod liver oil plus 0.1 c.c. distilled water; 0.1 c.c. ferrous iodide solution; 0.1 c.c. of linoleic acid; and 0.1 c.c. of ferrous iodide solution plus 0.1 c.c. of linoleic acid. All rats were examined at death for infections of the middle ears, of the glands at the base of the tongue, and of the salivary glands, as well as for renal and bladder calculi.

The administration of ferrous iodide and linoleic acid, alone or in combination, was ineffective, either for promotion of growth, the cure of xeroph-

themia, or as a preventive of infection or renal disturbance in rats deprived of vitamin A. At autopsy one or more of the typical lesions, associated with vitamin A deficiency, was found in all the rats that did not receive cod liver oil.—Lucille L. Reed, L. B. Mendel, and Hubert B. Vickery, *Science*, 76:300 (Sept. 30), 1932.

**The Viability of *Lactobacillus Acidophilus* as Affected by Freezing in a Sherbet Mixture**—To increase the palatability of *L. acidophilus* milk, it was sweetened, flavored, and frozen into a sherbet. Twenty-eight sherbets were prepared and a study made of the numbers of viable organisms remaining after 1, 2, 3, 5, and 7 days of storage at temperatures below  $-17^{\circ}\text{C}$ . Four strains of *L. acidophilus* were used in the preparation of the sherbets.

A variation was found in the viability of these strains when exposed to the conditions prevailing in such a frozen product. The numbers of viable organisms in sherbets carrying strain A organisms were reduced to only a few million per c.c. after 5 days' storage, while under similar conditions several hundred millions of viable organisms were usually present in the sherbets carrying the other strains of *L. acidophilus*. A variation in viability was found to occur in cultures of the same strain. Whether or not this variation was due to the age of the cells or some combination of factors was not determined.

A number of these sherbets were prepared so that they differed in reaction only. A more rapid reduction of organisms was found to occur in the sherbets of the higher titratable acidity. The sugar concentration, as it was varied in the sherbet mixtures, causes no significant variation in the viability of the organisms. It was possible to prepare sherbets in which large numbers

of organisms remained viable after 5 to 7 days of storage at temperatures below  $-17^{\circ}\text{C}$ . when the more resistant strains of *L. acidophilus* with a high initial count were used and the titratable acidity was not permitted to become excessive, preferably not in excess of 1.10 per cent.—Chas. C. Prouty and H. A. Bendizen, *J. Dairy Sci.*, 15:413, (Sept.), 1932.

**The Toxicity of Ethylene Oxide**—A concentration of 1:400 ethylene oxide was put in a small chamber and breathed by 4 men. It had a pleasant acetic acid-like smell, was slightly irritant to the nasal passages, but produced no after-effects. A concentration of 1:80 had a definite irritating effect on the nasal passages in 10 sec. There was no lachrymation. The liquid placed on skin boils, at once evaporates, leaving no mark, irritation, or erythema. One drop placed in the eyes of rabbits showed sharp conjunctivitis with blepharitis, but the condition subsided rapidly to normalcy in 4 days, and there was no permanent damage to the eyes. Intravenous injection in rabbits, 175 mg. per kg. body weight, proved fatal in 6 hours.

Early symptom was diarrhea and after 4 hours fine tremors of the limbs, the stance was wide and the feet splayed with the head dropping on the floor. Respiration was regular but somewhat hurried. Nystagmus was present and there was incoördination of limbs and jaws, followed by convulsions. Between convulsions the animal lay helpless and unable to hold up head or support body on legs; all the muscles were lax and toneless. A dose of 146 mg. per kg. body weight produced no symptoms beyond diarrhea and dislike of movement. A dose of 133 mg. per kg. was given and repeated after 20 hours.

Following the first dose, the animal showed wide stance, with fine muscular

tremors. The second dose caused death during the night. A dose of 85 mg. per kg. was given and repeated after 43 hours and again in a further 48 hours. After the first dose, there was nothing abnormal; after the second, convulsions followed by recovery; after the third, convulsions and death. Autopsy findings in these animals were congestion of all organs with catarrhal changes in kidney tubules and small numerous submucous hemorrhages in stomach.

A concentration of 1:80 for 30 minutes proved fatal to mice, rats and guinea pigs. Post-mortem changes were marked damages throughout the body. Concentrations varying from 1:80 to 1:150 for single exposures and from 1:80 to 1:800 in repeated exposures were used. In the concentration 1:80 for 30 minutes, all mice (3) were dead in  $2\frac{3}{4}$  hours, the rats (3) were all dead in 6 hours, having become markedly dyspnoeic, two were destroyed after 7 hours and the third survived; all rabbits had slight weakness of hind legs and were killed three days after exposure. Autopsy findings were the same as before.

A concentration of 1:100 for 30 minutes proved fatal to rats and mice, and 1:150 proved fatal to mice only, the effects on other animals being in proportion to those noted for 1:80. All single exposures in small concentrations produced like effects.

From feeding rats with vapor contaminated food, the authors conclude that enough ethylene oxide was retained from an atmosphere filled with ethylene oxide by the foodstuffs (bread, butter, margarine, boiled fat bacon, cheese and oatmeal) to render them dangerous to health at least. No class of foodstuff has escaped suspicion entirely. When sprayed on food this substance is highly dangerous. Ethylene oxide injected intravenously in a fatal dose causes a drop in blood urea from normal 42 mg. per 100 c.c. of blood to 33 mg.

per 100 c.c. Damage to kidney is sufficient to cause death.—W. J. Greaves Walker and C. E. Greeson, *Brit. J. Hyg.*, 32:409 (July), 1932.

**Do Children Who Drink Raw Milk Thrive Better Than Children Who Drink Heated Milk?**—During the past few years, raw milk advocates have contended that heating milk adversely affects its healthfulness and growth-promoting capacity, drawing their conclusions from experiments conducted at the Ohio State University, (*Jersey Bulletin and Dairy World*, Feb. 11, 1931), and the British National Institute for Research in Dairying (*Lancet*, Mar. 21, 1931). Extensive studies were made by the U. S. Public Health Service in coöperation with the health departments of ten states.

Studies were made of 3,700 children, ranging from 10 months to 6 years of age. There was no significant difference between the average weight of children who received no milk except raw milk for more than the latter half of their lives. The weights were 33.6 and 33.2 lb., the difference being in favor of heated milk. The heights were 37.5" and 37.4", the insignificant differences being in favor of heated milk.

There was no material difference between the two groups of children from the standpoint of the relative percentage of life during which various supplementary foods were included in the diet, except in the case of cod liver oil, which was included during an average of 41.6 per cent of the lives of the children receiving heated milk, and an average of only 27.6 per cent of the lives of the children receiving raw milk. This difference did not, however, affect the relative positions of the two age-weight curves significantly, since the average weight of the 636 children in the heated-milk group who received no cod liver oil at all was 33.5 lb. as compared with 33.8 lb. for the 794 children in

the heated-milk group who received cod liver oil during more than half of their lives. The parents of the children receiving predominately raw milk reported a higher incidence of diphtheria, scarlet fever, intestinal disturbances, and rickets than did the parents of the children receiving heated milk only.

The two groups of children were divided into 3 major race groups, Anglo-Saxon, Latin and miscellaneous, but the age-weight and age-height curves were not materially affected by the race dis-

tribution. It is concluded from this study that the growth-promoting capacity of heated milk plus the supplementary diet received by the average American child of 10 months to 6 years is not measurably less than the growth-promoting capacity of raw milk plus the supplementary diet received by the average American child of 10 months to 6 years.—Leslie C. Frank, F. A. Clark, W. H. Haskell, M. M. Miller, F. J. Moss and R. C. Thomas, *Pub. Health Rep.*, 47:1951 (Sept. 23), 1932.

## INDUSTRIAL HYGIENE

**The Manufacture of Linoleum—**A historical and geographical introduction is made of the linoleum industry which in 1929 in the United States had 7 establishments, 5,544 employees and value of products amounting to \$57,250,449. The gross sales in Canada amount to approximately \$15,000,000 a year.

The actual plant conditions are described for two plants, particularly a description of the processes. The potential health hazards considered to exist consist of linseed oil (containing lead), cork dust and benzol, with a number of others described elsewhere in literature. There is also a job classification made which points out the chief hazards in each occupation in the industry.—Retail Credit Company, *Industry Rep.*, 7, 2: 11–21 (Feb.), 1932. E. R. H.

**Some Dust Hazards of Industry, With Particular Reference to Silicosis—Also, The Very Least an Employer Should Know About Dust and Fume Diseases—**The first of these is a 15 pp. pamphlet which summarizes from literature the chief features about siliceous dust and silicosis. The second is a small 8 pp. pamphlet devoted to

the subject in the title with a further discussion of what constitutes reasonable care against the effects of dust and fumes. (These two pamphlets are commendable statements of the case by The Willson Products, Inc., manufacturers of respirators and protective equipments.)—Frederick Willson, M.D., Reading, Pa., 1932.

**Safety in the Manufacture and Use of Acetylene—**The paper describes technical processes in the manufacture and use of acetylene and the incidental accident risks, also legislative measures adopted in various countries for the prevention of accidents. Tests and experiments are included.—International Labour Office, World Peace Foundation, 40 Mt. Vernon St., Boston. 6 shillings. E. R. H.

**Hardening Procedures and Upper Respiratory Disease (Common Cold)—**Author's summary:

1. Over 300 adults were observed for 35 weeks from September 29, 1929, to May 31, 1930, when every effort was made to secure reports of all attacks of upper respiratory disease (common cold).

2. The group that during the winter slept with windows partially open, and the group

that slept with windows wide open showed no significant difference in respect of (a) frequency, and (b) severity of attack of upper respiratory disease (common cold). In respect of type of attack it was found that of the two groups the second (wide open windows) suffered relatively (a) fewer attacks with coryza and sore throat, and no cough (Cor+C—ST+), (b) more attacks with coryza, cough, and sore throat (Cor+C+ST+), and (c) more attacks with cough.

3. The group that exercised outdoors less than 8 hours per week in the summer, and the group that exercised 8 or more hours per week, showed no significant difference in respect of (a) frequency, (b) severity, and (c) type of attack of upper respiratory disease (common cold).

4. The group that exercised outdoors less than 4 hours per week in the winter, and the group that exercised 4 or more hours per week, showed no significant difference in respect of (a) frequency, (b) severity, and (c) type of attack of upper respiratory disease (common cold).—

William M. Gafafer, *Am. J. Hyg.*, 26, 1:233-240 (July), 1932. E. R. H.

### Dermatitis and Compensation to Workmen—

Sir Vivian Henderson asked the Home Secretary whether there had been an increase or a decrease in the number of cases of dermatitis in the last 3 years for which compensation had been paid; and whether any steps were taken by his department to encourage the wearing of gloves or mittens in appropriate cases. Sir Herbert Samuel replied: "The Workmen's Compensation Statistics for 1928, 1929, and 1930 (which is the last year for which figures are available) show an increase in the number of cases. There were 1,170 cases in 1928, 1,405 in 1929; and 1,499 in 1930."

Various steps have been taken by the department to enforce or encourage the wearing of gloves as a precaution against dermatitis. For example, gloves are required for persons employed in various processes under the Chemical Works Regulations of 1922, and the Chromium Plating Regulations of 1931, and under the Welfare Order of 1918 for use of bichromate potassium or sodium in dyeing, the Hollow-ware and Galvanising Welfare Order of 1921, and the Tanning Welfare Order of 1930.

Further, a general leaflet providing information as to the causes of dermatitis and recommending precautions, including the use of gloves, has been prepared and widely dis-

tributed among occupiers of works likely to be affected, and, with a view of securing the coöperation of the workers, a form of cautionary notice which can be exhibited in the workrooms has been issued and put on sale through the Stationery Office. Reference is also made to the value of gloves in certain special memoranda dealing with the prevention of dermatitis in particular processes.—

*Med. Off.*, 1232:100 (Mar. 5), 1932.

E. R. H.

**Air Conditions and the Comfort of Workers**—The importance of air conditions to the comfort, health and efficiency of workers is stressed, while the temperature standards for comfort in relation to humidity and air movement are described for both winter and summer conditions.

The methods of measurement of physical properties of the air with an illustration of the sling psychrometer, the anemometer, and the kata-thermometer are given. "Conditioned air" is discussed and "effective temperature" while the latest designed "comfort zone" chart is exhibited and explained. There is a synopsis of the effects of high atmospheric temperatures on man, a brief description of the methods of removal of excessive heat and moisture and the nature of what constitutes "air cleanliness." — Policyholders Service Bureau, Metropolitan Life Insurance Co., New York, *Indust. Health Series* 5, 20 pp., 1932.

E. R. H.

### Carbon Monoxide, Acute and Chronic Poisoning and Experimental Studies—Authors' conclusions:

We admit that this is but a preliminary step in any study of this interesting subject but it does seem from our findings that CO is not rapidly eliminated from the body unless other measures than simple respiration of air are used.

It appears that in acute cases death is caused entirely by anoxemia and respiratory failure.

The body after death is capable, even after embalming, of absorbing sufficient carbon monoxide, when concentrated and with sufficient time of exposure, to produce all of the



macroscopic appearances and positive chemical findings of death due to this gas.

It is also possible to produce similar findings by injecting the body with either laked or whole blood, saturated with CO. These possibilities are of grave medico-legal importance.—

Thomas L. Ramsey and H. J. Eilmann,  
*J. Lab. & Clin. Med.*, 17, 5:415-427  
(Feb.), 1932. E. R. H.

**Bakers' Dermatitis from Activators Containing Persulphates—**  
This illustrated article is summarized by the author as follows:

An outbreak of dermatitis among bakers employed as dough makers occurred in New South Wales in 1929-1930. Over 50 cases were recorded—about 1 man in every 20 of those employed in dough making was affected by a papuloerythematous rash of hands, forearms, arms, neck and sometimes the lower extremities and the groin which cleared up on leaving work but recurred on returning.

Cutaneous tests showed that individuals who suffered from or who had been affected by dermatitis were sensitive to ammonium persulphate, an ingredient of yeast foods, or activators used, and that they were generally of a susceptible or allergic type. Removal of persulphate from these activators practically abolished the incidence of the disease.—

Charles Badham, Studies of Industrial Hygiene No. 16, Section I.-E. *Report of Director-General of Public Health, N.S.W., for year ended Dec. 31, 1930*, 71-76. E. R. H.

**The Printing Industry—**The printing, publishing, and allied industries in the United States was composed in 1929 of 24,369 establishments employing 280,908 wage earners who drew wages of \$596,142,000 and the value of products was \$2,760,945,000. Canada has also an extensive industry in this line with Toronto as the center.

Hygienic conditions are described for several typical plants with a description of processes in type printing, lithography, rotogravure, steel engraving, and photo-process engraving.

A description of the potential health

hazards includes excerpts from *Industrial Health-Hazards and Occupational Diseases in Ohio*, and from *Hygiene of the Printing Trades*, the latter a Bulletin of the U. S. Labor Statistics, 1917, by Dr. Alice Hamilton and Charles H. Verrill. Next follows a classification and an index of jobs which cites the chief health hazards of each. This is an industry involving accidents, noise, physical strain, monotony, sedentary work, postural hazards, glare and eye-strain otherwise, burns, acid burns, dermatitis and exposure to a considerable list of poisons depending upon the given process.—*Industry Report*, Retail Credit Co., Atlanta, Ga., 7, 3:23-37 (Mar.), 1932. E. R. H.

**Lacquers and Their Hazards—**The term "lacquer" is derived from the lac tree found in the East Indies. The present article is limited to coating products in which nitro-cellulose is the base. Such are also called pyroxylin lacquers. They are applied by the spray gun and dip tank, which have practically replaced the hand brush.

The ordinary lacquer contains 5 basic ingredients:

Nitro-cellulose (or nitro-cotton) gives water-proofness, hardness and durability to the coating.

Solvents and diluents for dissolving the nitro-cellulose and gums give quick drying properties, as well as preventing the finished film from blushing or turning white.

Gums or resins to thicken the coated film and add to its adhesive properties.

Softeners or plasticisers to overcome brittleness.

Pigments or coloring material to give color to the finish and also to reflect the actinic rays of sunlight, thereby making the coating more durable under outside exposure.

A diagram shows the percentage composition of an average lacquer—82 per cent of which is composed of volatile substances.

The amount of volatile matter constitutes the main hazard, with the diluents and solvents by far the most

important since these may consist of benzol, toluol, xylol, petroleum naphtha, and various olefine acetates, ethers, alcohols, etc. The evaporation rate of some of these is described as well as their toxic properties, some of which are cumulative. In addition, new solvents and combinations are constantly being placed on the market. There is a special discussion on ventilation and fire prevention.—William J. Burke, *Indust. Bull.*, New York Dept. of Labor, Albany, 11, 7:223–225 (Apr.), 1932. E. R. H.

**Silicosis and the Industrialist—**This article is by the managing director (technical) of Lever Brothers, Ltd., soap manufacturers, and discusses briefly points of historical interest as well as pathological features and other impressions brought out at the Johannesburg Conference in 1930.

In Great Britain the criterion of safety in the Workmen's Compensation Schemes goes no further than the composition of the mineral substance itself, e.g., the concentration of the  $\text{SiO}_2$  therein is not referred to. Thus, the Refractories Industries Scheme does not apply if the mineral contains less than 80 per cent total silica. In the Sandstone Industry the figure is 50 per cent. In America it is customary to gauge the risk on the number of particles of free silica per cu. ft. of air, irrespective of the other constituents of the dust. In South Africa the total number of mineral particles per cu. ft. is taken as the basis. Thus international agreement as to methods of estimating is much to be desired.

The fact that finely ground silica enters into the composition of many widely used household articles (such as soaps and cleansers) broadens the picture. The equipment for protective purposes in the company's plant at Port Sunlight bulks more largely to the eye than the operating plant itself. No

case of silicosis has yet occurred in any of the company's factories.—Horatio Ballantyne, *J. State Med.*, 40, 6:342–349 (June), 1932. E. R. H.

**Silicosis in Pottery Industry—**Mr. Wedgwood asked the Home Secretary the number of compensation claims made and the number granted, and the fatalities recorded, in the pottery industry since the silicosis order came into operation. Mr. O. Stanley replied: "I regret I have no information as to the number of compensation claims made, but the number of cases in this industry in which compensation was paid since February 1, 1929, when the Various Industries (Silicosis) Scheme came into operation, up to the end of 1931, is 322, including 87 fatal cases.—*Lancet* (London), 5681:160 (July 16), 1932.

E. R. H.

**Asbestos Industry Regulations, 1931—**This large sheet for posting in work places, etc., designates the industry and work processes covered, definitions, and duties. The latter refer in Part 1 to occupiers (employers), and in Part 2 to persons employed. There is a footnote referring to breach of regulations and the posting of same in conspicuous places.—Herbert Samuel, One of H. M. Principal Secretaries of State, Dec. 31, 1931. (Purchasable from British Library of Information, 270 Madison Ave., New York, price 1d. net.)

E. R. H.

**Fibrosis of the Lungs in South Coast Coal Miners, New South Wales—**Author's summary:

At the request of the Royal Commission on the Coal Industry in New South Wales (1929), a radiographic examination was made of the chests of a number of coal miners and a clinical examination of a smaller number.

A fine type of fibrosis of the lungs varying in degree from slight to marked was found to be present in 122 of 471 (25.9 per cent) coal miners examined and the incidence among

men who had worked on the South Coast coal-field only was 25.0 per cent.

This radiographic fibrosis was considered to be complicated by infectious processes in 49 of the 122 cases.

Radiographic appearances of tuberculosis in the form of an acute lesion, a latent process or an old scar, were found in 24 or 5.1 per cent of the 471 men examined.

It is concluded from the radiographic findings that a fibrosis of the lungs may be caused by working in coal mines of the South Coast, that the onset is slower and the disability less marked than from the disease produced in metalliferous mines and that the estimation of disability must depend less on radiographic findings than on clinical examination. This fibrosis of coal miners should be placed on a sound pathological and chemical basis.—

Keith R. Moore and Charles Badham, *Health*, Commonwealth Department of Health, Canberra, N. S. W., 9, 5:33-43 (including tables of radiographic examinations) (May), 1931. See also Section I.-E., Division of Industrial Hygiene, *Report of the Director-General of Public Health, N. S. W., for year ended Dec. 31, 1930*, pp. 67-68.

E. R. H.

**Illness Among Button Workers—**Five cases of a condition diagnosed as yellow atrophy of the liver recently occurred at Fort Madison (Iowa) among the personnel of a button factory, with 3 fatalities. A meeting of physicians disclosed, however, that a total of 16 cases had been reported since November, 1928, with 5 deaths. All the cases had occurred in men employed in the button factory during the winter months.

The work at the plant involved consists solely of sawing blanks from oysters and clam shells, which are shipped elsewhere to be finished into buttons. The shells are obtained from Texas, Mexico and Illinois.

At a meeting of the Fort Madison City Medical Society, it was generally agreed that in view of the absence of any tangible evidence of metallic poisoning, the disease must be considered of an infectious nature. Arrangements

have been made for prompt removal to the hospital of the State University of Iowa if another case should develop.—*Medical News*, Iowa. *J. A. M. A.*, 99, 2:140 (July 9), 1932. E. R. H.

**Tumors of the Skin Produced by Blast-Furnace Tar—**From experimental procedures using mice and various samples of tar, the author found that tar obtained from a variety of blast-furnaces produces malignant tumors. It is less active than gas tars but its carcinogenic properties can be enhanced by extraction with ether. If applied too frequently, blast-furnace tar produces ulceration of the skin, but its toxic effects are not well marked, as some animals survive for 56 weeks.

It appears that workers in iron works do not handle the tar as do those in producers of gas, tar, pitch, and paraffin. This explains the absence of such tar tumors in the former.—Georgiana M. Bonser, *Lancet*, 5657:775-776 (Apr. 9), 1932. E. R. H.

**The Health of the Women in the Hatters' Furriers Trade—**No clear instances were obtained of the peculiar nervous conditions characterized by self-consciousness, shyness and irritability which feature mercury poisoning. However, in a group of 89 women, 8 complained of loss of weight, 7 of dyspnea, 6 of indigestion, 5 of sore throat, 4 with pains in muscles or joints, 4 with back-aches, 3 of sleeplessness and 2 of marked fatigue. There were 7 cases that were considered as probably showing mild chronic mercury poisoning in the condition of the gums—purplish red or mauve discoloration. There were unfavorable effects from noise and a large proportion of abnormal conditions of the nose and throat, of overweight, constipation and dysmenorrhea.—Nelle Swartz, *Indus. Hyg. Bull.*, New York Dept. of Labor, May, 1932, pp. 266-267. E. R. H.

# CHILD HYGIENE

## THE PRESCHOOL CHILD

THE conviction is growing among public health administrators that health programs for the preschool child cannot well be conceived apart from the hygiene of infancy and maternal welfare. While it may be justifiable for various reasons to intensify first upon one phase of child hygiene and then upon another, in the end the whole field must be covered adequately as an integral part of the public health.

This fact is recognized fully by the Health Organization of the League of Nations, which has issued a comprehensive report on *Maternal Welfare and the Hygiene of Infants and Children of Pre-School Age*,\* prepared by a special committee to deal with these questions. A previous memorandum issued by the League of Nations, *Enquiries Into the Causes and Prevention of Still-Births and Mortality During the First Year of Life*, has been very helpful in orienting us in this difficult sector of child life.

The present report is based on an analysis and comparison of the experience by different countries in the child health field. It emphasizes that "in considering questions of maternity and infant hygiene, it is important not to lose sight of the other branches of modern public health administration with which these are bound up."

Maternal welfare is considered under the following general heads:

- Rate of Maternal Mortality
- Maternal Morbidity
- Causes of Maternal Mortality and Morbidity
- Reduction of Maternal Morbidity and Mortality
- Abortion and Contraception

The opening paragraph on maternal welfare states,

It is beyond doubt that many maternal deaths might be avoided and that much sickness might be prevented if it were possible to secure for all pregnant and parturient women adequate medical, nursing, and domestic attention. The prevention of obstetric disaster is not an altogether simple problem. It depends partly upon the professional skill of the doctor and midwife; partly, on the provision of facilities, such as hospital accommodation, medical or nursing attention, etc., for the patient unable to secure these for herself; and to no small extent upon the willingness and intelligence of the patient in seeking and following such advice as is available for her.

Reduction of mortality and morbidity is summed up as follows:

The causes of maternal mortality and morbidity being partly social and partly medical, it follows that measures which may serve to reduce sickness and death among mothers must be such as will improve the medical and nursing services for maternity, and will also educate the woman and her friends to realize the value of early, frequent and continuous supervision, careful treatment and efficient obstetric assistance. These measures may be divided into:

- (a) Medico-social enactments for the protection of maternity
- (b) The provision of facilities for supervision and treatment
- (c) A high standard of professional education for the doctor and midwife, so as to insure suitable obstetric attention
- (d) The education of public opinion

Especial attention must be given to the prevention and treatment of abortion if the maternal mortality rate is to be substantially lowered. The report succinctly states that,

A threatened abortion often receives no proper medical attention, especially if the woman herself attempted to interrupt pregnancy, and the doctor is frequently not summoned unless acute septic infection intervenes.

\* Obtainable from the World Peace Foundation, 40 Mt. Vernon Street, Boston, Mass. Price, \$.50.

Cases of abortion are not usually welcome in the maternity hospital because of their potentially septic character, and increased hospital accommodation is urgently needed for these cases, so that the uterus may be properly emptied if the abortion is inevitable, and suitable after-treatment provided. Instruction should be given at the prenatal clinic as to the dangers of abortion and the importance of seeking medical advice should it occur.

Infant welfare is discussed logically, beginning with measures directed toward the reduction of stillbirths and neonatal mortality which, despite all that has been done, remain unduly high.

Infant welfare is governed by certain general principles, though the precise measures taken to reduce infant mortality must be adapted to the existing customs, to the existing standard of public health, and to economic possibilities. In determining these principles, due account must be taken of the infant mortality rate in the district under consideration; the importance of this index was shown very clearly by the inquiry into infant mortality carried out in different countries in Europe and South America under the auspices of the League of Nations Health Organisation. A detailed study of the causes of stillbirths and infant mortality is contained in the reports drawn up as a result of this inquiry (*documents C.H.820 and C.H.908*[1]).

The following account is based on the experience gained in the course of that inquiry, and is intended for those countries, or rather those regions, having infant mortality rates approximating to the rates found in the districts covered by the inquiry; these rates vary from 50 to 200 per 1,000 (*i.e.*, 50 to 200 deaths under 1 year per 1,000 live births), and to these must be added stillbirths, varying from 23 to 64 per thousand live births.

Infancy must be protected against three main dangers: congenital and developmental defects, alimentary disturbances and infective disease. The first of these accounts for nearly all stillbirths and for deaths in the first 7 days of life, and as deaths in these two groups are generally attributable to similar causes, they may usefully be considered together. The other two conditions chiefly affect older infants. "Infection" covers acute or chronic infections, whether local or general, specific or

otherwise, and in this connection diseases of the respiratory passages are most important. Lastly, alimentary disturbances cover deaths due to faulty methods of feeding, which may or may not be associated with disease of the digestive system.

Due consideration is given to preventive measures, nursing care, infant welfare centers, homes for mothers and babies, boarding out of babies, and milk. The statement concerning slum destruction is particularly timely.

The importance of slum demolition is by no means confined to the sphere of infant mortality, but nowhere is its urgency and its efficacy more apparent than in this particular field, urban and rural slums both playing the same fatal part. Cold, heat, darkness and the absence of ultra-violet rays have a disastrous effect on the infant's health.

From a constructive standpoint, it may be added that, in the towns, the erection of workers' tenements where the children are crowded together, thus increasing the risk of infection for the younger ones, is not as satisfactory as the establishment of garden cities, where infants can more easily be isolated—at least, to some extent.

A considerable portion of the report is given to the health of the preschool child. The dangers of this period are clearly pointed out. Problems of nutrition, dental hygiene, acute and chronic infections, accidents, and mentally abnormal children—all receive due consideration. Practical preventive measures are set forth in some detail.

The welfare of the child from its second year to its admission to school is not yet as a general rule organized to the same extent as that of the infant and of the school child. Even in those countries which have done most towards improving the health of children as a whole, the preschool age is still neglected, not so much because the importance of supervision at this age has escaped the attention of public health workers, but because of the difficulties, both theoretical and practical, which the protection of children of this age presents. The problems encountered in the campaign against morbidity and mortality during the preschool age are very different from those to be solved in infant welfare. Many, indeed, have not yet been solved from the scientific point of view, for example, the

prophylaxis of whooping cough, poliomyelitis, etc. Again, it is more difficult in practice to remain in touch with children of this age than with those in their first year; and the great majority still escape the attention of the health officer.

To undertake the effective protection of children of preschool age, the rate of morbidity and mortality for each year should first of all be established, with the help of reliable statistics, and the relative importance of the different causes of disease and death should be studied. The available statistics are largely inadequate and give no exact idea of the state of health during this period. The morbidity is only known in the case of the few infectious diseases which have to be notified, and even these notifications do not appear to be made in the same way in all countries. We are therefore compelled to use mortality statistics, which necessarily only give an imperfect idea of the condition of children's health.

The Final Report of the Departmental Committee on Maternal Mortality and Morbidity\* of the Ministry of Health of England has appeared recently. It measures up fully to the high standards already set by the Ministry of Health and reflects great credit upon Sir George Newman, the Medical Officer of Health, and his distinguished confreres, who have brought their serious investigations to practical conclusions. The report is a model of clear-cut investigation and is presented in a form which is readily understood.

The main divisions of the report deal with methods of investigation, causes of maternal mortality, consideration of an adequate maternity service, statistical summaries, puerperal sepsis, and maternal morbidity. An instructive

chapter is given to the maternity services of the Netherlands, Denmark, and Sweden, and another to the high maternal mortality in certain districts of England and Wales.

The underlying causes of puerperal deaths of 5,800 women have been carefully analyzed. The committee found that

. . . the causes of death in these cases are of varied nature—clinical and social, administrative and economic—and are closely related one to the other. Thus, clinical errors are contributed to by economic conditions, and administrative measures are rendered nugatory by reason of ingrained social customs. A complete knowledge of all the circumstances in any case of maternal death is therefore necessary before apportioning blame to any individual or institution. We are, however, convinced that the primary essential for the reduction of a high maternal mortality is sound midwifery, before, during and after childbirth, and this does not chiefly depend upon administrative arrangements or the expenditure of public money. . . .

False hopes would be raised if it were suggested that all maternal deaths are preventable. Changes in social life necessary to raise the standard of health and physical development of the women of the nation can come only with time; great advances in medical knowledge must be made before many of the risks of childbirth can be eliminated; even then the factor of human fallibility will remain.

Nevertheless, we are confirmed in the opinion expressed in our Interim Report that at least half the deaths which have come under review could have been prevented had due forethought been exercised by the expectant mother and her attendant, a reasonable degree of skill been brought to bear upon the management of the case, and adequate facilities for treatment been provided and utilized.

This report should be read by every health officer, nurse, social worker, and especially by every obstetrician.

\* Published by His Majesty's Stationery Office, Adastral House, Kingsway, London, W.C.2, England, 1932. Price 2 s. 6 d. Net.

# PUBLIC HEALTH NURSING\*

**Institutes for Public Health Nurses**—The rural nurse working alone is in great need of special institutes like those on social hygiene, mental hygiene, tuberculosis and the like, such as are given by some of the staff of the National Organization for Public Health Nursing. This nurse is a busy person and is constantly carrying on a planned program. At night she is too tired to read or study much. She needs a constant reminder that she must keep up with the latest methods of procedure in her job.

Oftentimes the nurse working alone cannot take time off to go to summer school or far off conventions. Too often, too, the problems that are worrying her are never mentioned in the professional magazines she reads. She would often be glad to take up a certain line of study if there were only reference books available.

Institutes are within the reach of every nurse because they require so little time for study at so small a cost. Given by well informed, sympathetic people who can draw out the nurses in discussion and answer their questions, they are invaluable.

After attending Violet Hodgson's institute for public health nurses on tuberculosis one nurse writes:

I have been able more intelligently to help and assist those people who were trying to carry on a program, I knew what they were striving to do, I knew what to tell the patient, how to approach the patient with conclusions that were truthful, I knew better how to approach the doctors in charge, I knew better how to understand the danger of contacts, I knew the methods used in sanitariums for treatment and I could intelligently discuss

them with the family when letters arrived from the patient about his treatment. I knew better how to stand by the family, advising and encouraging them to send letters of cheer to the patient. I knew and felt the attitude of the patient when he should arrive home and have to adjust himself to that let-down feeling. All this I found in the institute.—

Anne C. Rivers, *How Much We Need Institutes, Trained Nurse & Hosp. Rev.*, 175, 176 (Aug.), 1932.

**In a Nutshell**—The public has never scrutinized health department budgets as carefully as now. This means that some of the obsolete and outworn methods of procedure will have to go. There will have to be "more head work in health work" from now on.

Three questions the health officer and even the public health nurse should be able to answer about their communities are:

1. What is the crude death rate?
2. What is the infant mortality rate?
3. What is the typhoid fever death rate?

Physicians and public health nurses have spent too much time examining or inspecting school children and finding defects. The important thing is to get the defects corrected. More responsibility can be put on the teacher in school health work. Public health workers need to spend more time working with preschool children.

Public health officers and nurses need to bend their efforts to get *every individual under medical supervision*. Health work in the future will concern itself more with the prevention of heart trouble, diabetes, cancer and the like. To get at these we need to keep hammering away at periodical physical examinations.—C. E. Waller, M.D., *Some Needs in Our Public Health Program of*

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

Today. Notes from address delivered at the 1932 Annual Conference of Indiana State Health Officers.

**The Nurse and the Public Library**  
—The burden of much of the need for general health information in a community falls upon the public health nurse. Her contact with the people who are most in need of reliable information about proper living, proper nutrition, and the rudiments of the care of the sick is direct. She knows the need and her duty is to bring her people into contact with some reliable source of information. The spoken word is limited in its use. "The public library is the broadest of teachers—one may say the only free teacher."

What the public health worker may expect of her public library depends upon whether she takes the librarian into her confidence. Adequate and effective library collections on technical matters grow slowly; they are never ready made. The nurse and the librarian together should plan the public health collection for the community. With so much fine free health literature now available it is not difficult for the library to supply at little expense a good collection of pamphlets and leaflets to supplement books.

The Newark (N. J.) Public Library has the following to offer in the field of health education:

1. Professional books for nurses and health executives
2. Books for teachers giving methods of health education
3. Books for adults wishing information on nutrition, health habits, child care, and care of invalids; leaflets, documents and

- valuable clippings on all of these subjects
4. Books interesting to children, aiming to foster good health habits; health songs, poems, plays and stories
5. Posters and pictures from every possible source which are lent to schools, organizations and individuals to be displayed in all kinds of places

The health worker in an isolated rural field without library facilities near at hand may establish a small collection of documents or inexpensive leaflets to lend to her people. Or she can put them in touch with state or county library commissions. Sometimes book trucks bring collections to rural homes.

The nurse can create a demand for the type of book that will educate her public in health matters. She can recommend and advise in the selection of books which she thinks will meet the demand she has created.—Marie Louise Brush, *The Public Library, Pub. Health Nurs.*, XXIV, 9:468-9 (Sept.), 1932.

**Two Services Combined in the American National Red Cross**—In the twentieth anniversary year of both the Public Health Nursing Service and the Home Hygiene and Care of the Sick Service of the American National Red Cross, on July 1, the two services were combined into one, with I. Malinde Havey, R.N., as director. The merger consolidates the national direction of the two most important chapter activities of the American Red Cross, and the approach to both through field service, correspondence and reports will be simplified.—Public Health Nursing and Home Hygiene Combined in One Service, *Red Cross Courier*, XII, 2:48 (Aug.), 1932.



# EDUCATION AND PUBLICITY\*

**An Explanation—With Regrets—**Too many national and state meeting programs under way in September, plus emergency work in the fall money raising campaigns for health and welfare agencies, left no time for the preparation of copy for this issue of the JOURNAL—E. G. R.

**"The Newspaper as a Social Agency"**—An address, under this title, was a highlight on the program of the National Conference of Social Work at Philadelphia in June. Delivered by Sevellon Brown, of the *Providence Journal*, it presented a stimulating philosophy for the newspaper and for the social agency as seen by a newspaper man and good citizen. Believing that it should be read by all who seek the cooperation of the newspapers in spreading health and other welfare ideas, it has been published by the Social Work Publicity Council, 130 East 22d St., New York. 15 cents a copy.

Said Mr. Brown:

What appeals to me as a newspaper man, in facing you as social welfare workers, is that together we have loyalties to institutions so strikingly American.

At a recent meeting of community fund workers in my New England home a visitor, recently returned from Europe, remarked that the spectacle there before him of 700 private citizens enrolled as canvassers, reporting gifts running into the hundred of thousands of dollars subscribed voluntarily year after year by private citizens to improve the social conditions and health of less fortunate individuals, could not be found in any country of the world outside the United States. It is true that social welfare work has been very highly developed under State auspices in Europe, but its voluntary and individualistic character with us is singularly American.

So it is with the institution of the American newspaper. In many respects it has been developed in step with the press of other countries, but the commercial advertising basis upon which it rests in this country, and in which lies locked the secret of its character—its impulses to good and evil, its incomparable independence and impartiality in the vital function of disseminating news, its undeniable demagoguery and tendency to sensationalism, is decidedly idiosyncratic and peculiarly American.

Of course Mr. Brown should have included Canada in his second paragraph above.

**"Behind the Front Lines"**—This is the general title of a series of mimeographed bulletins issued by the Association of Community Chests and Councils, Graybar Bldg., New York.

They are intended for use in the local chest money raising campaigns this fall and winter. They include facts and figures, incidents and statements collected from many sources.

The series of 13 bulletins includes the following on health topics: Public Health Nursing, Tuberculosis, Hospitals, Nutrition, Mental Hygiene, Social Hygiene, and Child Health. They have gone to the chests, and some of the nationals have sent their special bulletins to their locals.

Single copies, 10 cents; the whole series, \$1.00.

**Syndicated Health Columns**—*"Editor and Publisher Ninth Annual Directory of Features"* lists the following: "Dr. Evans Health Column," by Dr. Evans; "Food and Health," by Dr. Shirley Wynne; "Health," by Dr. Morris Fishbein; "Health and Beauty," by Dr. Sophia Brunson; "Health Column," by Dr. Iago Galdston;

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evert G. Routzahn, 130 East 22d St., New York, N. Y.

"Health, Heart and Home Page," by International Features Service; "Here's to Your Health," by Dr. Frank McCoy; "How to Keep Well," by Dr. W. A. Evans; "How's Your Health," by Dr. Iago Galdston; "Personal Health Service," by Dr. William Brady; "Pure Food Articles," by Dr. Royal S. Copeland; "Secrets of Health and Success," by Dr. Louis E. Bisch; "Your Child's Health," by Dr. Michael Shuman; "Your Health," by Dr. Logan Clendenin; "Your Health," by Dr. Royal S. Copeland.

Then there are such "features" as: "Your Weight and Your Height" and "That Body of Yours," by Dr. James W. Barton; "How to Reduce Without Dieting"; "How I Keep My Figure"; "How I Keep Fit"; quite a group on parents, mothers, babies and children; groups covering food and home economics—most of which deal more or less with health.

**When Advertising Is Health Education**—In "The Judd Family," the Cleanliness Institute, 45 East 17th St., New York, has dramatized, in the form of historical fiction, two centuries of soap making in New England. Three episodes, selected at intervals of a century in the life of one family, point steps in the growth of progressive attitudes and daily practices of living with regard to cleanliness and sanitation. The focus is on the use of soap and the material has been primarily selected for the purpose of increasing interest in soap.

Teachers of upper elementary grades,

who are seeking supplementary material on cleanliness, will find this story of soap making, with the accompanying bits of picturesque period information, definitely useful.—By a specialist in school health education. Copy of the pamphlet free to any health worker.

**Health Division of National Conference of Social Work**—The officers and newly elected members of the executive committee are nearly all concerned with health education:

*Chairman*—Albert H. Jewell, Kansas City, Mo.; *Vice-Chairman*—Virginia R. Wing, Cleveland; *Secretary*—Alice M. Hill, New York; *Members*—T. J. Edmonds, Des Moines; Howard W. Green, Cleveland; Bleecker Marquette, Cincinnati; Elba L. Morse, Marquette, Mich.; John Sundwall, Ann Arbor; Katharine Tucker, New York.

#### CUTTING COSTS

The whole range of department or association activities might well be checked by the full page of suggestions under "Short-Cuts and Savings," by Elwood Street. *Survey*, 112 East 19th St., New York. Feb. 15, 1932. 30 cents. Two paragraphs which touch interpretation:

Are you getting out a printed bulletin which might be done on the mimeograph? Are you getting out voluminous mail advertising which by judicious editing might be reduced in volume and cost and increased in readability? Are you getting out weekly bulletins which might be sent out bi-weekly?

Are you planning far enough ahead in your work so that all details are cared for as they come up and the cost of last minute activities and hasty plans which have to be changed is eliminated?

## BOOKS AND REPORTS

**Psychology and Psychiatry in Pediatrics: The Problem.** *Report of the Subcommittee on Psychology and Psychiatry of the White House Conference on Child Health and Protection*—Bronson Crothers, M.D., Chairman. New York: Century, 1932. 146 pp. Price, \$1.50.

Unless the physician interests himself in child psychology, someone else will, is the thesis with which the report of the committee opens, and to which it clings through 43 pages of the book. "Psychiatry and psychology have opened a fascinating field of study involving the personality of the child," it is stated, and inasmuch as "at present the medical profession is regarded by most people as the natural source of advice," it is prophesied that "a practitioner of medicine who ignores the personality of the children under his care will find his position as a family adviser in definite danger."

It is admitted that the physician may have difficulty in sorting the grain from the chaff of experimentation, fact, differing beliefs, and vague ideas presented by the many works on psychology: however, "we are confident that among them are indispensable tools for medical men." It is suggested that not enough training, actually dealing with psychology, is given in medical schools. Suggestions for improving the quality of service rendered by physicians are offered on pages 30 to 32.

The differing attitudes of the psychologist, psychiatrist, and physician are discussed. The valuable services of the psychologist and psychiatrist are recognized, but it is believed that what they offer should be linked with medical training. "Obviously, it seems to us, doctors can acquire relevant psychologi-

cal and educational attitudes and techniques more safely than psychologists and teachers can acquire adequate medical assets. Adequate medical care of the child cannot be given without intelligent attention to any intellectual and emotional difficulties which may be present."

Pages 44 to 60 are taken up with discussions of the report by psychiatrists, psychologists, pediatricians, mental hygienists, and others interested in its subject matter. Their comments add to the interest and value of the book. The greater part of the appendix presents information regarding the manner in which data for the report was secured, and the manner in which typical groups such as the Merrill-Palmer School, the Child Guidance Institute, and the Essex County Juvenile Clinic of New Jersey are operated.

The Psychiatric Social Worker's viewpoint, as expressed in reply to the questionnaires used by the committee, is presented.

The book is interesting reading for either professionals or laymen.

STELLA RANDOLPH

**Directory of Clinics and Health Stations** (*Reprinted from Directory of Social Agencies, New York, 1932, pp. 433-661*). Published by the Charity Organization Society in co-operation with the Welfare Council. Reprints from New York Tuberculosis and Health Association, New York, N. Y. Price, \$.40.

This handy little volume makes available an up-to-date list of clinics and health stations in New York City. There are four divisions to the book—baby health stations, clinics, mental hygiene, and pre-school and nutrition

clinics. The name of the clinic is listed, together with the address, telephone number, the name of the director, clinic hours, and fee, if any. Under the section devoted to this subject, clinics are listed alphabetically by types of service rendered. The arrangement of clinics by boroughs adds to the usability of the directory. A list of hospitals and clinics, with telephone numbers, appears in the front of the book, and there is also a reference index.

A table showing the distribution of clinics and health stations by boroughs is an interesting feature of the book. Of the 1,751 in New York City, 1,024 are in Manhattan, 178 in the Bronx, 412 in Brooklyn, 93 in Queens, and 44 in Richmond.

ALMA W. FRAAS

**Milk Production and Control, A Publication of The White House Conference. *Report of the Committee on Milk Production and Control, H. A. Whittaker, Chairman. New York: Century, 1932. 392 pp. Price, \$3.00.***

This volume should be one of the most correct and interesting of the series to which it belongs. It is written by four sub-committees, each of which had a Board of Advisers. It contains a great deal of useful material, though it shows some of the unevenness which might be expected from the number of authors concerned. It ends with two appendices, one on Safe Milk for the Farm Family and the other on Research in Progress on Nutritional Aspects of Milk.

The most disappointing section is that on Diseases Transmitted Through Milk. Judging from the references most of the alleged facts are taken from a publication of the White House Conference in 1931, *Communicable Disease Control*.

Two pages and a half are given to bovine tuberculosis which show a lamentable lack of knowledge of the history of this subject. Theobald Smith first

showed the difference in types of tubercle bacilli in 1896 not 1898. These differences were studied by the Royal Commission on Tuberculosis in England and the Imperial Commission in Germany. The text gives them as having been done by the British Commission and at the Gesundheitsamt in Berlin. It is hard to understand why an American publication, particularly one of this type, should wish to give credit to European rather than to American work. The laboratory of the State Live Stock Sanitary Board of Pennsylvania made its report in 1902, more than 2 years before either the Royal or the Imperial Commissions, which confirmed its findings, while the New York City board of health did not make its report until 1910.

This section gives a very old quotation from Theobald Smith, which would lead one to believe that bovine tuberculosis was transmitted to children only when large numbers of bacilli were put into the system, as in udder tuberculosis, or under "certain unknown favorable conditions." This last statement may be accepted, for the fact is that no one knows the conditions under which bovine tuberculosis is transmitted to human beings. The whole tendency of this section, as well as of the first appendix, is to belittle the danger of bovine tuberculosis to human beings, although on page 369 it is stated that in some regions one-fourth of all cases in children under 16 are of bovine origin.

This volume appeared just about the time that we had the report of the Committee on Prevention and Research of the International Crippled Children's Society, and that from the committee of sixty from the People's Health League in England, the first showing that 10 to 15 per cent of bone and joint tuberculosis was bovine in origin, and that of children 0-5, 21 per cent, and of those 5-16, 26 per cent, were bovine infection, while the English Commission

reports that 2,000 deaths and 4,000 new cases occur annually in that country from bovine infection.

The fallacy of Theobald Smith's statement concerning udder tuberculosis is shown by the official figures. In England, where cows suffer from tuberculosis up to 40 per cent only 0.2 per cent, as revealed by autopsy, have udder infection. In America where the general percentage of tuberculosis is estimated at 1.9 per cent—though it runs higher in dairy districts—post-mortem examinations of animals slaughtered on account of tuberculosis show only 0.1 per cent of udder lesions.

While the book contains much useful information, many of the references are very old and it is impossible to consider it up-to-date or an entirely reliable guide, as it should be.

MAZÛCK P. RAVENEL

**A System of Bacteriology in Relation to Medicine. Vol. VIII—**  
*By W. Bulloch, L. Colebrook, J. Cruickshank, et al. London: H. M. Stationery Office, 1931. 390 pp. Price, \$6.00.*

Volume VIII of this system covers a wide field. The chapter on fungus pathogenic to man is presented so as to stress the difference in outlook of the mycologist and the bacteriologist. No attempt is made to give a summary of the literature but rather to suggest—the author states—as to how precise knowledge can be obtained. It has therefore considerable value. The *Phycomycetes*, *Ascomycetes*, *Fungi Imperfecti* and the Ringworm group are individually thus considered.

The chapter on *Actinomycosis* and similar conditions is given under three chief divisions, the aerobic actinomyces, the anaerobic actinomyces and actinobacillosis. The chapter on the pathogenic *Leptothricæ* shows how unsuccessful the attempts to define their morphology and physiology have been,

in spite of their wide distribution. The difficulty encountered is due to the inability to use artificial culture methods with success.

The largest part of the volume is devoted to spirochetes and diseases caused by them. Excellent drawings of the various spirochetes are given. The blood spirochetes of the relapsing fever type have found in the blood of man in most parts of the world with the exception of Australia, and have been given various designations, but the author states that they all belong to one widely distributed species. In the chapter on syphilis the various diagnostic tests are well discussed.

Chapters on leptospiroses, yaws, the normal bacterial flora of man and swine erysipelas are included. Each chapter contains a short bibliography.

The treatment of the subject is very uniform, and this volume maintains the high standard set at the beginning for the series. ESTHER W. STEARN

**Habits for Safety: A Text-Book for Schools—By Gentles and Betts.**  
*Indianapolis: Bobbs-Merrill, 1932. 228 pp. Price, \$.67.*

This is an excellent text for teaching safety practices and developing safety habits. That is the primary purpose of the book and it fulfils it better than anything that has come to our attention. It is intended primarily for children 10 to 14; although adults would do well to read it. It is full of helpful suggestions and useful information.

The subject matter in the text is well chosen, and presented in a manner so it can be used in a variety of ways by teachers. It can be made a part of the general course in health and hygiene or given as a special course in safety instruction. It may be correlated with instruction in other subjects in the curriculum or the material used for working out safety projects. That feature combined with well chosen subject

matter makes the book especially valuable.

The first part of the text emphasizes the importance of developing habits for safety as a basis for successful living, and it does so without attempting to lecture to the children on the subject. A series of chapters call attention to common accidents in the home, the school, the city streets, the farm and in the workshops and suggest practices necessary to prevent such accidents. The last part of the book gives instruction in first aid procedures for the injured.

The book deserves the highest recommendations as a text for promoting safety habits and practices among children.

WILLIAM DEKLEINE

**A Textbook of Bacteriology—By Kenneth L. Burdon.** *New York: Macmillan, 1932. 108 pp. Price, \$2.75.*

This textbook of bacteriology is designed particularly for the use of nurses who have had more than the minimum amount of training acceptable in nurses training schools of non-university grade. In writing this book the author has presented the subject of bacteriology in non-technical language and has attempted to show the relationship to preventive medicine and hygiene. It appears that he has succeeded remarkably in making such a complex subject as bacteriology understandable to a group of students who do not usually have the prerequisite training in chemistry necessary to the understanding of the more fundamental aspects of bacteriology as we know it today.

This volume is distinctly different from most other textbooks of bacteriology. It has little space devoted to bacterial classification, which detracts from the general interest of the subject for many beginning students. The specific organisms concerned in infectious processes are considered from the standpoint of the regions of the body

which are infected. Along with this consideration of the organisms the author discusses the normal flora of the body. One cannot but question, even in a textbook for nurses, the author's statement that *Blastomyces hominis* is a kind of yeast. The printing and make-up of the book are excellent.

NEWELL R. ZIEGLER

**The Criticism and Improvement of Diets (*Memorandum to the Minister of Health*).** *London: H. M. Stationery Office, 1932. 14 pp. Price, \$1.10.*

This is an excellent review of nutrition by the Advisory Committee to the Ministry of Health. It may be summed up in the following conclusions:

To be satisfactory the diet must yield 3,000 calories per day per "man" and contain 37 grammes of animal protein. Women and children need proportionately less. The relations of protein, fat and carbohydrate must be satisfactory.

It must also supply mineral matter (of which calcium, phosphorus, iron and iodine are the most important elements) and vitamins A, B, C and D (of which the most likely to be lacking is D, followed by A and then C).

These are best supplied in the "protective foods," *i.e.*, milk and milk products, fish (especially fat fish and fish roes), liver, eggs, fresh fruit and fresh salad vegetables.

Only when the diet satisfies all these essentials can it be considered satisfactory. No defect in one essential can be compensated by excess in another.

MAZÏCK P. RAVENEL.

**The Principles of Animal Hygiene and Preventive Veterinary Medicine—By Leunis Van Es, V.S., M.D.** *New York: Wiley, 1932. Price, \$6.50.*

This book is written by an American author and is the first one of this nature to appear in the United States. It is a valuable addition to literature on the subject, written by a man of wide experience and education in animal hygiene and preventive veterinary medi-

cine. Such a book has long been needed and is a welcome addition to the knowledge of preventive veterinary medicine. It is the product of a combined experience, thought, and judgment rarely found in veterinary literature.

The importance of a book on preventive animal hygiene is emphasized when one considers the interrelation of human and animal diseases. Quite a number of diseases affecting the lower animals are transmissible to man, and have caused many fatalities in the human family.

The first part of the work deals in a masterful way with the principles and practical details of disease prevention as applied to the farm and farm animals; the latter part discusses the individual infectious and parasitic diseases of animals, and gives the latest essential information in regard to each that is of value in applying preventive measures.

Another thing that adds to the value of the text is that the author has selected references to each chapter for those who desire to pursue the topic in greater detail.

In this text we have usable information on important veterinary matters and Dr. Van Es is to be congratulated on his presentation of the subject.

A. J. DURANT

**Diabetes**—By *Elliott P. Joslin*. Cambridge: *Harvard University Press*, 1931. 70 pp. Price, \$1.00.

The 18th volume of "Harvard Health Talks" is written by an eminent authority. It tells us of that disease which has probably yielded to man's efforts more than any other during recent years. The author says:

To have claimed 9 years ago that a knowledge of the disease and how to control it would enable one to prevent diabetic coma would have exposed one to ridicule. Whereas all diabetic children at that period died of coma, today this complication is exceptional, and almost invariably due to ignorance or gross carelessness.

The book is divided into two parts, Individual Control, and State Control. To read one is to read the other—and both should be read by everyone, diabetic or otherwise. From the first, one gets the inspiration that possibly the individual may sometime learn to evaluate his medicaments, for the author says:

It is unfortunate that the worthlessness of quack medicines in all diseases cannot be tested as readily by the patient as in diabetes, because if this were the case the cost of medical care in the United States would be reduced by millions of dollars.

From the second we learn that public health concerns things other than infectious diseases—and that diabetes is on the increase.

C. F. ADAMS

**The Business Man and His Health**—By *Jesse Feiring Williams, M.D.* New York: *McGraw-Hill*, 1932. 175 pp. Price, \$2.00.

When, if ever, a business man sets forth on a literary pilgrimage in quest of the salubrity which most industrialists are erroneously thought to lack, he craves entertainment and inspiration as well as information. From this book, if he could be induced to read it, a business man might derive much healthful information, but he would secure from it but little, if any, amusement, recreation, or excitement. It requires more than an occasional witticism to offset continuous dullness, and this book is distressingly prosaic.

Included in it are such inevitable topics as health examinations, the functions of man, vacations, hobbies, exercise, "muscles and mussels," mental hygiene doctors, the perennial bromide—"the tired business man"—few of whom are ever actually overcome by lassitude, and a pun on the same subject—"the retired business man." None of it is calculated to overcome the inherent sales resistance of the average American mercenary, despite the fact

that most modern business men ought theoretically to have plenty of time now for reading. They require something more thrilling than this.

JAMES A. TOBEY

**Journal Southeastern Section American Water Works Association, Proceedings of Fourth Annual Meeting, Atlanta, Georgia, Vol. 2, No. 1, 1932.**

This journal publishes the papers presented at the Fourth Annual Meeting of the Southeastern Section of the American Water Works Association, held at Atlanta, Ga., March 22-24, 1932. Many papers of general interest included "Advances and Developments in Powdered Activated Carbon" by F. E. Stuart; "Our Streams and Their Flow" by E. D. Burchard; "Information on Water and Sewage Works Problems—Where It Can Be Found" by Linn H. Enslow; and "Some Trends of Municipal Sewage Disposal Practice" by Wellington Donaldson. Other papers presented were "Turbidimeters in Use at the Atlanta Filtration Plants," "Wells and the Part They Play in Our Water Supply," and "Water Works Accounting." Descriptions are given of the water softening plant at Thomasville, Ga., and of the water supply of Spartanburg, South Carolina.

VINCENT B. LAMOUREUX

**Population Characteristics by Census Tracts, Cleveland, Ohio, 1930**  
—By *Howard Whipple Green*, with a foreword by *Leonard P. Ayres*. Cleveland: The Plain Dealer Publishing Co., 1931. 236 pp. Price, \$25.00.

This volume contains a comprehensive analysis of the population of Cleveland, by census tracts and of 4 adjoining cities, according to age, sex, nativity, economic, social, and other factors. The first 72 pages are devoted to many valuable charts, graphs, maps, and general

tables with descriptive text, and illustrate how any city may, with the co-operation of the U. S. Bureau of the Census, which provided the basic data, study systematically its local problems relating to the people. The balance of the volume presents the detailed statistics by census tracts and an index map.

In bringing these exhaustive census data together, supplemented by additional material for 252 census tracts of the 5-city area, the author has rendered a most valuable service. The illustrations of various methods of applying census tract data to local problems are helpful to those who wish to study the economic, social, and health problems of a city on a district basis. As stated in the foreword, "The possibilities of the use of this material as a guide in all economic, social, and health programs are limitless, and the analysis of material is so carefully developed that even to one unacquainted with statistics, the basic facts stand out."

IRA V. HISCOCK

**Classic Descriptions of Disease. With Biographical Sketches of the Authors—By Ralph H. Major, M.D.** Springfield, Ill.: Thomas, 1932. 630 pp. Price, \$4.50.

Members of the medical profession, regardless of whatever specialty they may practise, owe a debt of gratitude to Dr. Major for this work, which represents an enormous amount of research, judgment in selection, and a great deal of work in translating articles from the languages in which they were written. There are 376 selections from original texts written by 179 authors, and 130 illustrations, many of which are unusual portraits, facsimiles of title and text pages, reproductions of apparatus and drawings, etc., all of which are excellent and full of interest.

The arrangement leads to some duplication. The selections are grouped under 10 heads, with the particular condi-



tion or disease and the authors of the papers placed under these heads. We would like to suggest some rearrangement. For example, under Infectious Diseases, sub-heading Tuberculosis, are 2 pages by Laënnec on Physical Signs of Tubercles, while under Diseases of the Digestive Tract, more than 500 pages further on in the book, we find his photograph, a brief sketch of his life, and the description of mediate auscultation, and the discovery of the stethoscope. Laënnec owes his fame more to this discovery than to any other one thing, though everyone recognizes him as a master of medicine. The quotation in this latter place concerns cirrhosis of the liver, to one type of which he gave his name, but he describes the case as "Hemorrhagic pleurisy of the left side, with ascites and organic disease of the liver," and it is found in his treatise on auscultation. One extract from his writings is also found under Diseases of the Circulatory System, and four under the head of Respiratory Diseases.

In the preface the author properly calls attention to the study of medical history urged by Sir William Osler. Another of our great teachers, Dr. Victor C. Vaughan, also insisted on the historical method of teaching. Some of our schools have introduced courses on the history of medicine, but we know of no other book which not only gives the biography of the masters of medicine, but also the selections from their writings which are most famous as well as useful. The average physician, even in cities of considerable size, does not have a library at hand which contains the originals of anything like the material here given. Everyone who has taught medicine knows that the average student is densely ignorant even of the names of those founders of medicine which should be as familiar to him as his own. Here in one volume, the author has given us the story of 179 men who have played a leading part in the

development of medical science as we know it today. He has not confined himself to men of old, but has included quite a number of those now living. It is something of a disappointment not to find the names of men like Koch, Schaudinn, Kitasato, Bordet, Wassermann, Klebs, Metchnikoff, Loeffler, and others. These have been purposely omitted because their discoveries were bacteriological, while the field of the book is chiefly clinical medicine. We miss also such names as those of Oliver Wendell Holmes and Semmelweis, though certainly the investigations on puerperal fever by these two men concern clinical medicine directly.

These are suggestions rather than criticisms. The book as a whole fills us with admiration, not only on account of its contents, but also because of the enormous amount of well considered and well directed energy which the author has shown. It is one of the most useful which has been published for a long time, and deserves a wide circulation not only among physicians in general and libraries, but also as a textbook in medical schools. The printing and make-up of the book are excellent, though there are a number of typographical errors. It is printed on very heavy paper, perhaps because of the large number of illustrations. We congratulate both the author and the publisher on this piece of work.

MAZÏCK P. RAVENEL

*Hygiene of Community, Home and School—By E. W. Steel and Ella G. White. New York: Harper, 1932. 386 pp. Price, \$2.25.*

In emphasizing health knowledge as an adjunct to good citizenship the authors present their subject matter in a new light. The book contains 23 chapters and includes numerous illustrations, charts, pictures, and diagrams. It covers the entire field of public health as it appeals to, and can be absorbed by,

the student in teachers' colleges or other colleges offering courses in this field. Public health officials will also be interested in the method of approach.

Besides chapters on milk, water, excreta disposal, plumbing, rodent control, insect control, and food protection, the book also discusses the economics of health, the activities of health departments, child and maternity hygiene, and the importance of light and ventilation with reference to health. The legal aspects of public health work are covered in a separate chapter. This new book thus provides ideal material for college health courses.

ELLA G. WHITE

**Quantitative Clinical Chemistry—**  
*Vol. I, Interpretations—By John P. Peters and Donald D. Van Slyke. Baltimore: Williams & Wilkins, 1931. 1,264 pp. Price, \$12.00.*

This volume was begun about 7 years ago. In it and the companion volume on methods the clinician and the biochemist have joined hands to produce what appears to be the most comprehensive and authoritative book on the subject in this country. The names of the collaborators need no introduction.

In their preface, the authors inform us that the collaboration is a close one; scarcely a paragraph escapes being the joint work of both men. The intention in the discussions is to treat "those substances which are of importance in clinical medicine and for the determination of which suitable methods are available."

The general plan of the book gives the physiological rôle of the substance under discussion, followed by a consideration of its significance in diagnosis and therapy. The physiological sections fill more space than the clinical application, "because the disease processes are only special examples of extreme functional disturbances," and "because so little is known of the

changes in disease of some of the substances considered."

Only occasionally is more than passing notice given to historical considerations, such as under glucose. However, full bibliographies are given at the end of each chapter which total over 4,000 references and serve as an excellent and convenient key to the literature of this important field. The book undoubtedly will stand at the head of the list of publications on this subject.

C. F. ADAMS

**Quantitative Clinical Chemistry—**  
*Vol. II, Methods—By John P. Peters and Donald D. Van Slyke. Baltimore: Williams & Wilkins, 1932. 957 pp. Price, \$10.00.*

To the laboratory man, this is the most important publication for many years. It is full of methods and procedures applicable to any laboratory, and replete with material not found in any other manual.

Fortunately for the non-chemist, Chapters I and II concern general chemical technic and special biochemical technic. These occupy 83 pages and deal not only with fundamentals but with many simple dodges and handy procedures that every laboratory worker needs.

The authors have followed the general plan of describing methods of different types for each substance, thus enabling any worker to choose according to his needs or tastes. This includes a gravimetric, a titrimetric, a colorimetric and a gasometric procedure when desirable methods for each were available with, if advisable, macro and micro forms. Each chapter is prefaced with a discussion of the principles on which the methods are based, drawn in such a way that the discussion serves as a guide to the literature.

While there is more or less grouping of procedures for the determinations of any given substance, gasometric methods for sugar, urea, etc., etc., are not

placed in the chapters concerning these substances, but are gathered into a chapter by themselves. It is interesting to note that some of the details of the gasometric methods in Chapter VII are somewhat in advance of the original descriptions.

The authors have added an appendix for methods not strictly within the scope of quantitative analyses as here presented, though used in clinical laboratories. They include such procedures as concern renal and hepatic function tests, bile pigments in blood, plasma, etc. As in the companion volume, each chapter is concluded by a useful bibliography. The volume ends with an author index and a subject index.

One dislikes to call attention to insignificant typographical errors in such a good book, but the publishers' "Sans Tache" should be better guarded. For instance, pages 9, 61, 217, 508, and 571 have errors and others could be cited. Upon the whole, nothing on methods has come off the press in recent years comparable to this volume.

C. F. ADAMS

Proceedings of the Ninth Annual Short School, Texas Public Health Association, November 9-14, 1931.

The Texas Association of Sanitarians, now the Texas Public Health Associa-

tion, affiliated with the American Public Health Association, held the largest and most successful Short School of its career at Houston, Tex., November 9-14, 1931. The Proceedings are divided into 4 sections, the first including a summary and registration list, and the second a group of papers relating to medical and administrative public health, including the subjects of tuberculosis prevention, diphtheria protection, vital statistics, health work of the Shriners, significance of the U. S. Chamber of Commerce health contests, school superintendents and health work, new physical education law and health education, and the need of a new sanitary code for Texas.

Papers presented in the third section on nursing and sanitation include itinerant nurse services, science of sanitation, sanitation in industry, military sanitation, prison sanitation, a malaria control program for Texas, importance of a national unified milk sanitation program, the new Arizona dairy law, and oyster sanitation. The fourth and last section is devoted to papers relating to the laboratory, including a description of the State Hygienic Laboratory, bacterial counts of milk methods, practices causing errors in the Babcock test, thermophilic bacteria, and operation of the Texas standard milk ordinance program.

VINCENT B. LAMOUREUX

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Weather and Pneumococci—Pneumococcus incidence in normal throats was highest in inclement weather. In some cases, there was an association between respiratory infections and Group IV pneumococci. Note the length of the title.

BROWN, M. H. and ANDERSON, E. A further Bacteriological Study of the Bacterial Flora of the Throat of Normal Persons and Persons

with Minor Respiratory Infections with Especial Reference to Pneumococcus. *J. Prev. Med.* 6, 5:407 (Sept.), 1932.

Typhus Fever—Evidence is presented establishing two manifestations of typhus; the highly communicable form is louse-borne, whereas the endemic form is transmitted from rat to man by fleas and not from man to man except

in lousy populations. Lice, ticks, mites, and other "insects" may possibly transmit the disease from rat to rat.

DYER, R. E. *et al.* Endemic Typhus Fever of the United States. J.A.M.A. 90, 10:795 (Sept. 3), 1932.

**Is Raw Milk More Nutritious Than Pasteurized?**—"The growth-promoting capacity of heated milk plus supplementary diet received by the average American child of 10 months to 6 years is not measurably less than the growth promoting capacity of raw milk plus the (same) supplementary diet." This exact and somewhat stilted statement summarizes a statistical study of growing youngsters in answer to the raw milk propaganda. However, the same propaganda will rise superior to the mere enumeration of statistics no matter how exact may be the control.

FRANK, L. C. *et al.* Do Children Who Drink Raw Milk Thrive Better Than Children Who Drink Heated Milk? Pub. Health Rep. 47, 39:1951 (Sept.), 1932.

**Seasons for Colds**—Statistical evidence of the conclusions based upon common observation that colds are generally less prevalent from April through August, with a "low" late in July or early in August, and high in prevalence from September to March inclusive.

FROST, W. H. and GOVER, M. The Incidence and Time Distribution of Common Colds in Several Groups Kept Under Continuous Observation. Pub. Health. Rep. 47, 36:1815 (Sept. 2), 1932.

**Drill Dust Removal**—Dust removed by exhaust from rock drills not only protects the operator but improves the speed of the drill at small cost.

HATCH, T. *et al.* Control of the Silicosis Hazard in the Hard Rock Industries. J. Indust. Hyg. 14, 7:246 (Sept.), 1932.

**Tonsillectomy and Health**—"Excellent end-results in selected cases have been statistically over-weighted by in-different end-results in cases in which

the operation has been performed without sufficient indications as a more or less routine prophylactic ritual. In our opinion, a large proportion of the tonsillectomies now done on children are unnecessary, entail some risk, and give little or no return." Thus concludes a British study.

GLOVER, J. A. and WILSON, J. The End-Results of the Tonsil and Adenoid Operation in Childhood and Adolescence. Brit. M. J. 3740:506 (Sept. 10), 1932.

**Staphylococcus Dissociation**—Demonstrating a filtrable form of *S. aureus*, probably a cyclo-stage, during which the organism is avirulent, the authors offer the suggestion that this may explain how the organism lurks in the body without manifestations only to appear in lesions later when virulence returns.

HOFFSTADT, R. E. and YOUNG, G. P. *Staphylococcus Aureus*: Dissociation and Its Relation to Infection and Immunity. J. Infect. Dis. 51, 2:216 (Sept.-Oct.), 1932.

**Compulsory Smallpox Vaccination Heresy**—British health officials in this symposium frankly question the wisdom of compulsory vaccination in Great Britain in the absence of the severe type of smallpox.

LEDINGHAM, J. C. G. *et al.* Vaccination. J. Roy. San. Inst. 53, 3:134 (Sept.), 1932.

**British Maternal Mortality**—Frank, though not new, is this discussion of the causes of maternal and infant deaths in England. The important factors of sepsis, abortion and illegitimacy are given the consideration they deserve.

McILROY, L. The Prevention of Maternal and Infant Mortality. J. State Med. 40, 9:497 (Sept.), 1932.

**Settlements for the Tuberculous**—Papworth Village is cited as evidence of the value of and need for a system of tuberculosis settlements throughout Great Britain. It would seem that the

same conditions hold true this side of the Atlantic as well.

VARRIER-JONES, P. Tuberculosis Settlements. *J. State Med.* 40, 9:536 (Sept.), 1932.

### Experiments With Poliomyelitis

—In a series of three papers, the author presents evidence of a toxic factor in the stools of poliomyelitis patients which, when injected into guinea pigs, causes conditions strikingly like those found in human patients. This virus

can be neutralized by previous injection of convalescent serum.

TOOMEY, J. A. Demonstration of a Toxic Factor in the Stools and Urines of Poliomyelitis Patients. *J. Prev. Med.* 6, 5:379 (Sept.), 1932.

Adult Hygiene—Heart disease, pneumonia, tuberculosis, and student and industrial health are discussed in a stimulating Canadian symposium.

ONILE, J. A. *et al.* Adult Health. *Canad. Pub. Health J.* 23, 9:403 (Sept.), 1932.

## BOOKS RECEIVED

BLIND THE DOOR OF DELUSION. By "Inmate—Ward 8." New York: Macmillan, 1932. 325 pp. Price, \$2.00.

THE MODERN HOSPITAL YEAR BOOK. 12th ed.—1932. Chicago: Modern Hospital Pub. Co., 1932. 707 pp. Price, \$2.50.

HANDBOOK OF BACTERIOLOGY. 3d ed. By Joseph W. Bigger. Baltimore: Williams & Wilkins, 1932. 459 pp.

POPULAR SCIENCE TALKS. Edited by Ivor Griffith. Philadelphia: Philadelphia College of Pharmacy and Science, 1932. 319 pp. Price, \$1.00.

INDUSTRIAL PSYCHOLOGY. By Morris S. Viteles. New York: Norton, 1932. 652 pp. Price, \$5.50.

THE CRISIS IN HOSPITAL FINANCE. By Michael M. Davis and C. Rufus Rorem. Chicago: University of Chicago Press, 1932. 241 pp. Price, \$2.50.

TREATMENT OF SYPHILIS. By Jay F. Schamberg and Carroll S. Wright. New York: Appleton, 1932. 658 pp. Price, \$8.00.

MAGAZINE PUBLISHING. By Lenox R. Lohr. Baltimore: Williams & Wilkins, 1932. 328 pp. Price, \$4.00.

WATER PURIFICATION CONTROL. By Edward S. Hopkins. Baltimore: Williams & Wilkins, 1932. 131 pp. Price, \$1.75.

EPIDEMIOLOGY: HISTORICAL AND EXPERIMENTAL. The Herter Lectures for 1931. By Major Greenwood. Baltimore: Johns Hopkins Press, 1932. 80 pp. Price, \$1.50.

HOUSING AND THE COMMUNITY—HOME REPAIR AND REMODELING. Washington: President's Conference on Home Building and Home Ownership, 1932. 291 pp. Price, \$1.15.

READINGS IN EDUCATIONAL SOCIOLOGY. Vol. I. Edited by E. George Payne. New York: Prentice-Hall, 1932. 376 pp. Price, \$3.00.

BENZOL (BENZENE) POISONING. By Cary P. McCord and Associates. Cincinnati: Industrial Health Conservancy Laboratories, 1932. 84 pp. Price, \$2.00.

THE CURATIVE VALUE OF LIGHT. By Edgar Mayer. New York: Appleton, 1932. 175 pp. Price, \$1.50.

PROHIBITION—A NATIONAL EXPERIMENT. Edited by James H. S. Bossard and Thorsten Sellin. Philadelphia: American Academy of Political and Social Science, 1932. 269 pp. Price, \$2.50.

HOSPITALS AND CHILD HEALTH. Publication of The White House Conference. New York: Century, 1932. 279 pp. Price, \$2.50.

WATER ANALYSIS FOR SANITARY AND TECHNICAL PURPOSES. 2d ed. By Herbert B. Stocks. Philadelphia: Lippincott, 1932. 135 pp. Price, \$3.50.

MASSAGE AND THERAPEUTIC EXERCISE. 3d ed. By Mary McMillan. Philadelphia: Saunders, 1932. 359 pp. Price, \$2.75.

FUNDAMENTALS OF PERSONAL HYGIENE. By Walter W. Krueger. Philadelphia: Saunders, 1932. 291 pp. Price, \$1.75.

REFERENCE HAND-BOOK FOR NURSES. 7th ed. By Amanda K. Beck. Philadelphia: Saunders, 1932. 354 pp. Price, \$1.50.

PROSPECTING FOR HEAVEN. Some Conversations about Science and the Good Life. By Edwin R. Embree. New York: Viking Press, 1932. 185 pp. Price, \$1.75.

## NEWS FROM THE FIELD

*It will be appreciated if readers will send to this department such items of news interest concerning public health activities as they consider suitable.*

### REORGANIZATION OF ITALY'S NATIONAL BUREAU OF MATERNAL AND CHILD WELFARE

THE National Bureau of Maternal and Child Welfare of Italy has recently been reorganized on the basis of 5 years' experience. In the decree on reorganization it was pointed out that the work of the bureau is not to provide relief, but to help the needy through moral and material means to become self-supporting and capable of living in society.

The new plan aims to provide a uniform well coördinated method of maternal and child welfare work instead of the present disorganized and diversified system, to establish maternal and child welfare agencies even in the remote rural districts, and to introduce trained and paid welfare workers instead of the volunteers by which most of the work of the bureau has been done so far.

The provincial branches, heretofore each in charge of a council and committee of volunteers, will now be conducted by paid directors, experienced in maternal and child welfare work and in administrative matters. The technical specialized organ of the provincial branch, heretofore lacking, will be the office of social work (social secretariat), which will organize new welfare agencies and will supervise and coördinate all the work in the province. The actual work of the provincial branch will be done by new agencies called "centers of assistance to mothers and children." Each province will be divided into urban and rural districts, in each of which such a

center will be established. The work of the center will be carried out mainly by a social-service office and a clinic for mothers and children. The social service office will do case work.

The clinic will not be for the purpose of treatment, but for the purpose of teaching the mother proper care of herself and her child, with a view to prevention of illness. In those rural districts where it would not be feasible to organize stationary centers, their work will be done by traveling centers. To each clinic there will be attached a day nursery for children between the ages of 3 months and 3 years and a dining room for mothers. Day nurseries for children 3 to 6 years of age must be established in children's institutions which are already in existence.

The regulations also provide for the employment of social workers both in urban and rural localities, and for the establishment without delay of courses for the training of officials and subordinate employees. According to the latest information, such courses have been established already in two cities.

The bureau is maintained by appropriations from the national treasury and by private contributions.—*Maternità ed Infanzia*, Rome, May and June, 1932; *Rassegna della Previdenza Sociale*, Rome, June, 1932.

### IIADASSAH

THE eighteenth annual meeting of the Hadassah National Women's Zionists organization was held in New York September 19-20. Dr. Haim Yassky, Director of Hadassah medical activities in Palestine, described the work being done there. Since 1925, largely through its efforts, infant mor-

tality has been reduced from 53.5 per 1,000 to 22.1 in 1931.

Dr. Nathan Ratnoff, chairman of the American Jewish Physicians' Committee, announced this committee's cooperation with Hadassah in the establishment of a medical center in connection with the Hebrew University of Palestine.

Prof. C.-E. A. Winslow, of Yale University, was one of the speakers.

#### NURSING CALENDAR FOR 1933

THE National League of Nursing Education is presenting a hanging calendar of quotations which will make an appropriate gift. The title is "Quo Vadis?" and the cover page is from a painting by H. Willard Ortlip, who painted the cover for the Florence Nightingale calendar. The price of the calendar will be \$1.00 per single copy and \$.75 per copy for quantities of 50 or more—National League of Nursing Education, 450 Seventh Avenue, New York, N. Y.

#### HOSPITAL INSURANCE IN DALLAS

THERE are two hospital-insurance plans now operating successfully in Dallas, Tex., where the Baylor and Methodist Hospitals have separate contracts with several thousand employed persons.

For the payment of \$.50 a month, the hospital agrees to provide, without extra charge, hospital service when needed for a period not to exceed 21 days during a 12-month interval. After 21 days the beneficiary is given a one-third discount on regular and special hospital services required during an illness.

Contagious, tuberculosis, and mental cases are not included in the benefits after they have been diagnosed as such. Obstetrical cases are granted 50 per cent discount on hospital services.

The financial experiences of the Baylor and Methodist Hospitals indicate that the plans in effect are actuarially sound. In one hospital the average receipts per patient-day of care were \$6.60, in the other \$7.60. It was found

that approximately 10 per cent of the members used the service a year, and that the average length of stay was approximately 9 days. Both of the Dallas hospitals are convinced that the total revenue from these members is greater than would have been paid by the individual patients on a private-fee basis for hospital service.

C. Rufus Rorem, of the staff of the Committee on the Costs of Medical Care in his book, *The Crisis in Hospital Finance*, states that voluntary sickness insurance on a group basis is steadily growing in favor.

#### IOWA ASSOCIATION MEETING

THE Iowa Public Health Association held its annual meeting in Des Moines October 6-7. Among the topics considered were: "The Veterinarian's Interest in Public Health," "The Building and Maintenance of Swimming Pools," and "Energy Cost of Work in Normal Children."

#### REPORTING OF THE BIRTHS OF DEFORMED CHILDREN IN ITALY

A LAW of May 16, 1932, requires every physician or midwife attending the birth of a deformed child to report the fact to the local mayor or health officer.

According to the same law any physician who in treating a patient notices symptoms that are causing or may cause in the future inability, even if partial, to work for a living must report the fact to the previously mentioned authorities. Fines are prescribed for violations.—*Gazetta Ufficiale*, Rome, June 11, 1932.

#### PERSONALS

DR. FRANK M. LAWSON, of Willows, has been appointed Health Officer of Glenn County, Calif., succeeding the late Dr. Samuel Iglick. Dr. Thomas H. Brown succeeds Dr. Iglick as Health Officer of Orland, Calif.

DR. DAVID M. KINDOPP replaces the late Dr. Charles J. Durand as Health Officer of Colfax, Calif. Dr. Kindopp is also Health Officer of Placer County.

DR. LOUIS L. ROBINSON has been appointed Health Officer of the recently incorporated city of Fairfax, Calif.

DR. EUGENE N. NESBITT, of Grand Rapids, Mich., has been appointed Director of City Welfare. He will continue his duties as superintendent of the city tuberculosis hospital.

DR. OLLIE M. GOODLOE, F.A.P.H.A., of Louisville, Ky., has been appointed to succeed Dr. Sam R. Page as Health Officer of Breathitt County, Ky.

DR. GRADIE R. ROUNDTREE, of Horse Cave, is the New Health Officer of Adair County, Ky.

DR. CHARLES FRED BLANKENSHIP, of Hawesville, has been appointed Health Officer of Hancock County, Ky.

DR. CARL N. GAMBILL, member A.P.H.A., of Salyersville, succeeds Dr. Miriam Marting as Health Officer of Greenup County, Ky. Dr. Marting recently resigned.

DR. ARTHUR J. REVELL, of Arma, became Health Officer of Cherokee County, Kans., on September 1, succeeding Dr. Clarence R. Hepler, who has accepted a similar position in Sedgwick County, Kans.

DR. HARRY C. HUMMELL has been announced as the new Deputy Health Officer of Rochester, N. Y., to succeed Dr. Arthur M. Johnson, who recently became Health Officer on the retirement of Dr. George W. Goler.

DR. C. L. OUTLAND, member A.P.H.A., who has served as Chief Medical Inspector in charge of contagious

diseases for the Richmond City Bureau of Health for the past 6 years, has been appointed Medical Director of the Public Schools of Richmond, Va., succeeding Dr. N. T. Ennett who resigned.

MAGNUS W. ALEXANDER, member A.P.H.A., died September 10, at the age of 62. He was formerly connected with the General Electric Company, held the post of chairman of the Massachusetts Commission on Old Age Annuities and Pensions, and was a member of the Commission on Compensation for Industrial Accidents in Massachusetts. He was the author of the book *Safety in the Foundry*, as well as many articles on economic subjects. Mr. Alexander headed the National Industrial Conference Board since its organization in 1916.

## CONFERENCES

November 4, New York State Association of Public Health Laboratories, Albany, N. Y.

November 6-11, Fifteenth Annual Convention, American Dietetic Association, New York, N. Y.

November 11-12, Third Biennial Conference of the National Council of Parent Education, French Lick Springs, French Lick, Ind.

November 14-16, Southern Branch A. P. H. A., Birmingham, Ala.

November 14-16, Southern Medical Association, Birmingham, Ala.

November 14-16, National Malaria Commission, Birmingham, Ala.

November 14-18, Tenth Annual Short School, Texas Public Health Association, Dallas, Tex.



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# American Journal of Public Health and THE NATION'S HEALTH

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## The Rôle of Activated Milk in the Anti-Rickets Campaign\*

ALFRED F. HESS, M.D.

*New York, N. Y.*

IN endeavors to protect the community from disease our usual concern is to have at our command a specific agent or some preventive method which is effective. In regard to rickets quite the contrary holds true. In this disorder we are burdened with such a multiplicity of preventive agents that we find ourselves at a loss to decide which one to select. We have at our disposal direct irradiation with ultra-violet rays, cod liver oil or its concentrates, viosterol, activated milk, and still others. This is by far the greatest array of specifics which can be marshalled against any disease. In the course of the past few years, however, the problem has become simplified for it is increasingly evident that, from a communal standpoint, the best method of preventing rickets involves the use of some form of antirachitic milk and, furthermore, that we must draw a distinction between measures which are most suitable for the prevention and those most suitable for the cure of rickets. As has been emphasized elsewhere, there are two reasons why an activated milk should be singled out for prophylactic use; first and mainly because it provides a therapeutic measure which is automatic, in that the specific agent is embodied in the food which is essential for the nutrition of the infant. In addition, milk has the distinction and advantage of being the food which contains calcium and phosphorus in highest degree.

It is now over 7 years since I reported experiments showing that

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\* Read as a part of the Symposium on Milks of Special Antirachitic Value before the Food and Nutrition Section of the American Public Health Association at the Sixty-first Annual Meeting at Washington, D. C., October 26, 1932. Other papers from the Symposium will be published later. The Report of the Committee on Milk and Dairy Products, dealing with the administrative aspect of the same subject, will appear in the Year Book.

milk can be activated by means of exposure to ultra-violet energy.<sup>1</sup> However, although milk of this kind has been used on a considerable scale in a few cities in Europe, notably Frankfurt, Germany, it has not been used commercially in this country, except in the form of irradiated dry milk. As you know, instead of elaborating an antirachitic milk by means of direct irradiation this end may be accomplished by means of feeding cows activated yeast. Furthermore, milk may be given antirachitic properties by mixing irradiated ergosterol with it, as has recently been shown by Laquer,<sup>2</sup> or by adding a concentrate of cod liver oil. However, these two methods, whatever advantages or disadvantages they may prove to entail, cannot be considered at the present time as neither of these types of milk has been subjected to extensive clinical test, which after all is imperative in all questions involving human nutrition.

As reported a year or more ago, the milk of cows which are receiving large quantities of irradiated yeast develops high antirachitic potency and may be recommended to protect infants from rickets.<sup>3</sup> This measure is being used to an increasing extent on numerous farms, mostly of the certified variety, in various sections of the United States. It is a procedure that is applicable especially to the certified farm, where the ration of the cows can be thoroughly controlled and one can be certain that a potent yeast is fed in adequate amount, and more particularly, where frequent biologic assays of the milk can be carried out. It would seem, however, that it is hardly applicable for the general supply of large communities, especially for great cities which require many thousands of farms to meet their demands. For this purpose irradiation has an inherent advantage, in that the milk can be activated at a central station, perhaps at the same time that it is subjected to pasteurization.

I shall not enter into a consideration of the technic of activation as this aspect has been considered recently in several communications.<sup>4</sup> It is sufficient to say that milk can be rendered highly antirachitic by subjection, for a period of merely 16 seconds, to the radiations of certain carbon arc rays, and that in the course of this process it does not develop any disagreeable taste or odor nor is it deprived of its essential vitamins. If we would obtain a product which is reliable and constant, it is necessary, as emphasized in an investigation with Supplee and Dorcas, to carry out the irradiation under fully controlled conditions.<sup>5</sup>

In a clinical test carried out during two winters in baby health clinics of the Department of Health in New York, it was established unequivocally that such irradiated milk is able to prevent rickets

almost without exception. Indeed, it prevented the development of this disorder in negro infants who are exceptionally susceptible. It should be added that the majority of these infants were under 6 months of age and received three-quarters rather than an entire quart of milk daily. Biologic assays of this milk showed that it did not vary to a great extent in vitamin D content. In general it may be stated that the variation of vitamin concentration in foods, not only of the antirachitic factor, but of other vitamins as well, has been stressed far too greatly. It should be remembered that nature supplies us with vitamins quite irregularly and that her quota is by no means rigid. For example, nothing could be more variable than our daily quota of the antirachitic factor. This varies in amount according to exposure to sunlight, to whether the day is clear or cloudy, whether we are out of doors much or little or expose our bodies to a greater or less extent and, particularly, according to season and to whether we live in the North or in the sunny South.

There is another point which I wish to emphasize—the clinical distinction which has been found to hold true in regard to the potency of various antirachitic agents. It is the established custom to refer to an antirachitic agent such as viosterol, cod liver oil, or irradiated milk, as possessing a certain number of antirachitic units per c.c. or per quart. Indeed, it has been accepted that the potency of one preparation may be expressed in terms of another, for example, that the strength of viosterol may be stated in terms of cod liver oil. In 1930, we reported clinical observations which showed that this assumption, based on assays on rats, does not accord with clinical experience, in that much more viosterol was needed to protect infants than should be expected or required, as judged by bioassays of the two antirachitic agents.<sup>6</sup> In 1931 a similar discrepancy was pointed out in connection with a comparative clinical test of viosterol with “yeast milk” and with irradiated milk.<sup>3</sup> The preventive dose of these three antirachitic agents is approximately 24 ounces of yeast milk, 3 teaspoonfuls of cod liver oil, or 10 drops of viosterol. Translated into terms of rat units this means that 120, 200, and 800 units are required, respectively, as a daily prophylactic dose. This inequality, from the laboratory point of view, was quite unexpected. The problem was emphasized still further when it was found that 35 units of irradiated milk, as determined by the standard rat technic, sufficed to protect a large series of infants.

Clinical experiences of this kind are supported by suggestive laboratory observations which have been noted during the past few years. For example, over 2 years ago it was shown that chickens require a far

larger number of antirachitic units when this factor is supplied in the form of viosterol than as cod liver oil.<sup>7</sup> These observations have been substantiated and extended from various sources. In view of various considerations of this nature I suggested at Stockholm in 1930 that "it is possible that in addition to vitamin A, cod liver oil contains something which is of value in rickets and which is not present in irradiated ergosterol." "

Observations on cows have led to the discovery of similar discrepancies. It was found that about three times as much irradiated ergosterol as of activated yeast had to be incorporated in the daily ration in order to procure approximately 160 units of antirachitic vitamin in a quart of milk. Recently, Krauss and his colleagues reported a similar lack of uniformity, from the point of view of unitage, in the therapeutic activity of butter fat and of cod liver oil.<sup>9</sup> Without going into further detail, it would seem, as a result of these clinical and laboratory experiences, that we should not generalize in regard to the potency of the various antirachitic agents, but that we must be guided by the clinical activity which each is found to possess. Furthermore, one preparation should not be compared to another, for example, activated milk with viosterol, or viosterol with cod liver oil. It is permissible merely to draw a comparison between various preparations of the same kind, of viosterol to viosterol, of cod liver oil to cod liver oil. Such being the case, it is evident and should be clearly understood that the new "international unit" for vitamin D which allows a solution of irradiated ergosterol or of cod liver oil of known antirachitic potency to be used as "the standard of reference" does not imply that, from a clinical point of view, these two agents are equivalent.

Activated milk, in the fluid or dry form, possesses the advantage not only of providing an automatic method of preventing rickets and of supplying this essential factor in a medium rich in phosphorus and calcium, but, as has been shown, it accomplishes this end by means of an exceptionally small amount of the antirachitic factor. In view of these important advantages I do not hesitate to recommend the general use of such milk for infants and children, especially in large communities. Whether adults, whose bones are growing at a much slower rate, require a supplement of vitamin D to their dietary must be left undecided, to be answered according to the outcome of subsequent investigation. There can be little doubt, however, that the rapidly growing organism requires this factor and that, in the temperate zones, the infant and child do not receive the optimal amount from the radiations of the sun and from the meager supply in the food.

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NOTE: Such experiences with antirachitic agents make one wonder whether similar discrepancies may not exist in the realm of other vitamins; for example, whether carotin exerts the same activity clinically as an equivalent number of vitamin A units of cod liver oil, butter, vegetables, etc.

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## Prevention and Cure

" . . . A rational distinction may be drawn, and even a logical contrast set out, between medical activities primarily put into operation in the interests of the individual—or medical practice which is mainly clinical—and those principally directed to the well-being of a community; but this is very far from establishing an antithesis between prevention and cure.

When legitimate distinctions are intended they should be exactly and accurately stated, and it is time that the false contrast should not only be discouraged both in medical and in popular writings and speeches, but ended. . . ."

In this address Sir George Newman shows, with his usual charm of style and his usual abundance of illustration and example, that during the past hundred years almost all the great advances in what is called preventive medicine have been made possible and actually brought about by private practitioners, and mainly in the course of their ordinary clinical work. There have been some great sanitarians and some famous laboratory workers in this field who were laymen, but in the fascinating story of modern preventive medicine "there is nothing more significant or more illuminating than the constructive service which has been rendered by medical practitioners. It is they who have made the bricks, found the road, explored the facts, carried on the fight, and educated the people in a way of life. . . . The medical man is an individualist and he is educated by an inductive method. All unconsciously, without losing his individualism and by way of induction, he has been the builder of State medicine and has opened wide the gates of prevention." The exuberance of metaphor merely emphasizes the importance of the achievement. "In every branch of medicine and in every county of England practitioners have placed their names permanently upon a roll of fame as preventive benefactors and explorers."—Editorial, *Brit. M. J.*, July 30, 1932, pp. 209–210.

# Protective Value for Infants of Various Types of Vitamin D Fortified Milk

## A Preliminary Report

JOHN McK. MITCHELL, M.D., JOHN EIMAN, M.D.,  
DOROTHY V. WHIPPLE, M.D., AND JOSEPH STOKES, JR., M.D.  
*Medical School, University of Pennsylvania, Philadelphia, Pa.*

THE multiplicity of antirachitic agents available at the present time has resulted naturally in efforts by both laboratory and clinical workers to determine their relative values. The biological assays of these various agents have made available data concerning their potency in units of vitamin D. But we would emphasize the fact that biological assays on animals have overshadowed the clinical data obtained upon human infants, and that the clinical value of a given antirachitic agent does not necessarily parallel its potency in terms of rat units.

Hess and Lewis<sup>1</sup> have recently pointed out the fallacy of estimating necessary human dosage of different antirachitic agents purely on the basis of rat assays. They have also shown that the greatest discrepancy arises when vitamin D fortified milk is compared with other antirachitic agents.

This study is concerned with the determination of the antirachitic potency of various types of vitamin D fortified milks; using in parallel series groups of human infants and rats. This preliminary report deals with three types of milk:

Milk irradiated with the carbon arc lamp  
Milk from cows fed irradiated yeast or "yeast milk"  
Milk from cows irradiated with the carbon arc lamp

We are especially interested in the last named product because of the lack of clinical studies of its efficacy and because of the recent

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\* Read as a part of the Symposium on Milks of Special Antirachitic Value before the Food and Nutrition Section of the American Public Health Association at the Sixty-first Annual Meeting at Washington, D. C., October 26, 1932. Other papers from the Symposium will be published later. The Report of the Committee on Milk and Dairy Products, dealing with the administrative aspect of the same subject, will appear in the Year Book.

development for practical purposes of the more powerful carbon arc lamps.

Previous studies of great value have been reported upon irradiated milk. Hess and Lewis,<sup>1</sup> in the study mentioned, reported the units of vitamin D in fluid milk irradiated with the carbon arc lamp, together with the prevention and treatment of rickets in human infants by means of this milk. They found that less than a quart of such milk would protect infants from rickets despite the fact that it contained "only 50 units of vitamin D as assayed by the standard rat technic." However they do not mention how much less than a quart of this milk will protect infants from rickets. Hess, Supplee,<sup>2</sup> and their coworkers had published studies upon the number of units of vitamin D in dried milk, irradiated with carbon arc lamps, previous to drying. Their results with dried milk were entirely in accord with the results of their studies upon fluid milk. Many other valuable studies have been made upon the direct irradiation of milk, among which those of Watson,<sup>3</sup> and Cowell,<sup>4</sup> in England, Scheer,<sup>5</sup> in Germany, Wieland,<sup>6</sup> in Switzerland, and Kramer,<sup>7</sup> in the United States, should be mentioned. The clinical data available, however, upon the amount of irradiated milk necessary to protect human infants from rickets are inconclusive.

Since the results of our studies upon both infants and rats fed irradiated milk agree quite closely with Hess's and Lewis's results obtained at about the same time and with the same type of carbon arc lamp, we prefer for the present discussion to summarize them in a very few words.

In our studies of irradiated milk as in the other studies, two widely separated rat colonies were used with protective and curative experiments proceeding at the same time in both colonies. The standard methods of rat assay were used with the exception that varying amounts of 50 per cent cream were fed to the rats in place of whole milk or butterfat, as used by most workers. The object of using 50 per cent cream was to insure a somewhat more normal intake of salts than the usual rat assay includes. Since we could find little data upon the antirachitic potency of irradiated skimmed milk, we fed it in varying quantities to different groups of rats. From the results of these studies we concluded, as expected, that the antirachitic power of the irradiated whole milk lies almost entirely in the butterfat, since even large quantities of skimmed milk had little effect in either protective or curative experiments.

The method of irradiation was practically identical with that used by Supplee, Hess, and Lewis, and we are indebted to Dr. Supplee for his assistance in the arrangements. The milk was passed twice in



a thin film (approximately 0.4 cm.) over a wash board cooler in a large pasteurizing plant, and was exposed for 16 seconds to a carbon arc lamp in such a way that each c.c. of milk received a total of about  $2\frac{1}{2}$  million ergs, between 2,000 and 3,000 Angström units.

In this study the mixed pasteurized milk used for a control experiment contained on the average, 6 units of vitamin D per quart. The irradiated milk fed as 50 per cent cream to rats in the two separate colonies, in both preventive and curative experiments, contained on the average 65 units of vitamin D per quart of milk; an amount slightly higher than that found by Hess and Lewis. Throughout the present studies we have used the Steenbock unit for vitamin D in recording the rat assays.

The clinical studies were made upon infants resident in St. Vincent's Hospital, a large foundling home. Those chosen ranged between birth and 6 months of age at the time of starting the experiment. They remained constantly in a ward where it was not possible for direct sunlight to reach them, and where any possible effect of skyshine was excluded by glass and screening. For 2 hours each day, however, during 3 summer months they were placed in a low roofed, screened pavilion, which was so placed with reference to surrounding buildings that no direct sun whatever touched it and skyshine was also excluded. All antirachitic agents were withdrawn 6 weeks before commencing the experiments, which to date have continued for a period varying between 6 and 8 months, beginning from February to April, and continuing to the following October. We have planned to continue the experiments for the full circle of a year.

Physical and X-ray examinations were made at the beginning of the period and repeated monthly. The clinical criteria used in estimating the presence of rickets were those suggested by Hess. The most critical interpretation was placed upon the X-ray readings. It was not possible to obtain blood calcium and phosphorus determinations. A small control group with no antirachitic agents was started but unfortunately most of these babies were discharged too soon to be counted in the study. Formulae were left unaltered so that the group receiving the test milk might be comparable to those remaining on other antirachitic agents.

In Table I are shown the results at the beginning of the test period, and 6 to 8 months later clinical and X-ray diagnoses were made separately; one examiner having no knowledge of the other's findings. For the purpose of saving time and space the intermediate examinations are not recorded here. Clinically no child ever showed evidences

TABLE I  
 INFANTS TREATED WITH IRRADIATED MILK  
 Number of cases showing rickets clinically and by X-ray

At time of starting milk						After 6-8 months on irradiated milk							
Clinical evidence		X-ray evidence				Clinical evidence				X-ray evidence			
		None	Mild	Mod- erate	Act- ive	None	Mild	Mod- erate	Act- ive	None	Mild Heal- ed	Mod- erate Heal- ed	Act- ive
None	8	8	0	0	0	8	0	0	0	6	1	1	0
Mild	3	3	0	0	0	2	1	0	0	3	0	0	0
Moderate	2	2	0	0	0	2	0	0	0	1	1	0	0
Active	0	0	0	0	0	0	0	0	0	0	0	0	0

of rickets greater than that frequently seen in children in private practice on what is considered adequate antirachitic therapy with cod liver oil or viosterol. By X-ray examination no persistent active rickets whatever was found. We recognize of course that the last readings here reported were made in October and for final estimation the work is to be continued through the ensuing winter.

The infants grew satisfactorily and a distinct general impression was gained by an independent observer that their physical condition was superior to that of the infants on cod liver oil.

Owing to the loss of the small control group it is not possible to show the presence of rickets among an identical group. It is obvious, however, that under the given conditions rickets will develop unless adequate antirachitic therapy is resorted to. It is customary in the institution to give from  $\frac{1}{2}$  to 1 teaspoonful of cod liver oil daily and among the older infants and young children the presence of moderate rickets is seen frequently, and severe rickets occasionally.

A small group of markedly rachitic infants have been treated in the wards of the University and Children's Hospitals with irradiated milk as the only antirachitic agent. Prompt healing has occurred in each instance.

We are continuing such studies both protective and curative with a larger group of infants for the purpose of determining more accurately if possible the interrelationship of the human factor and the antirachitic factor particularly as to the quantitative relationship of the antirachitic factor in milk.

In connection with the direct irradiation of fluid whole milk we are carrying on studies with rats concerning the effect of irradiation upon vitamins A and B<sub>1</sub>, and with guinea pigs concerning its effect upon vitamin C. As far as we have been able to determine, irradiation with the carbon arc lamp as outlined previously in this paper has no destructive effect upon either vitamin A or vitamin C. Our studies have not yet been completed upon its relation to vitamin B<sub>1</sub>.

We are unable as yet to report a protective study upon a group of infants fed upon "yeast milk." Our experience so far with this antirachitic agent has been concerned with rat assays and a few rachitic infants. These confirm the favorable results reported by Hess,<sup>2</sup> and Wyman,<sup>6</sup> and others. The milk used for the rat assays was a commercial "yeast milk" bought on the open market.

The studies concerned with milk from cows irradiated with the carbon arc lamp present the most interesting data. Gowen<sup>9</sup> and his coworkers in 1926 exposed cows for 15 to 30 minutes to ultra-violet rays (type of lamp not mentioned) and reported the cure of rickets in chicks with this milk. Milk from unexposed cows did not cure control chicks. In the same year, Falkenheim<sup>10</sup> and his coworkers reported that milk from cows exposed to a mercury vapor quartz lamp had definite antirachitic power, whereas unexposed control cows produced milk with practically no antirachitic power. Supplee<sup>11</sup> reported that milk produced in summer has greater antirachitic potency than winter milk, and suggested that irradiation of the cow in the sunshine is responsible, but also mentioned that the influence of summer food might be a factor. Steenbock<sup>12</sup> and his coworkers conducted careful studies concerning the effect of irradiation of cows by the sun and by the mercury vapor quartz lamp upon the antirachitic potency of their milk. Their general conclusion was that irradiation of the cow with sun or artificial ultra-violet rays does not affect the vitamin D potency of the milk. In one series of experiments they felt there was a slight increase of vitamin D in the milk. On the other hand, they had reported in previous studies<sup>13</sup> that the antirachitic potency of goat's milk could be increased 24 times by irradiation of the goat with a mercury vapor quartz lamp. Hess<sup>14</sup> has also reported that irradiation of a nursing mother by means of a mercury vapor quartz lamp increased the antirachitic potency of her milk.

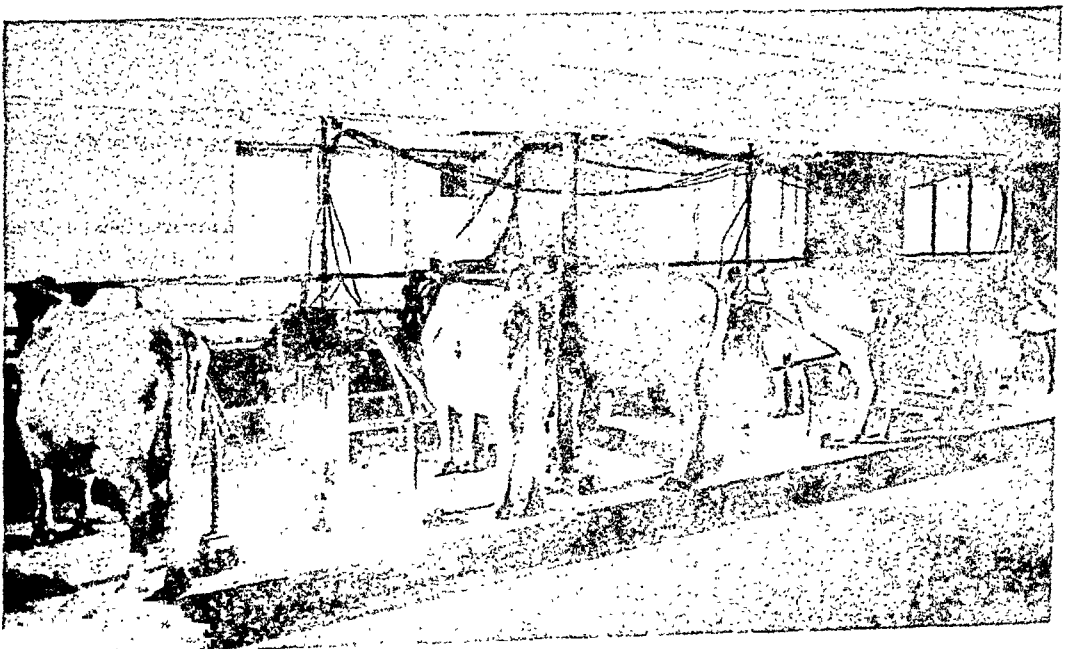
In our own studies we have used the carbon arc lamp of the same type as mentioned in the direct irradiation of fluid milk. This lamp differs from the mercury vapor quartz lamp in that it has a continuous spectrum and an intensity many times greater than the mercury lamp. There were 50 cows in the experiment and they had all been fresh

TABLE II  
 INFANTS TREATED WITH MILK FROM IRRADIATED COWS  
 Number of cases showing rickets clinically and by X-ray

At time of starting milk						After 6-8 months on the milk							
Clinical evidence	X-ray evidence					Clinical evidence				X-ray evidence			
	None	Mild	Moderate	Active		None	Mild	Moderate	Active	None	Mild Healed	Moderate Healed	Active
None	16	16	0	0	0	15	1	0	0	12	2	2	0
Mild	4	4	0	0	0	2	2	0	0	2	1	1	0
Moderate	1	0	0	1	0	1	0	0	0	0	0	1*	0
Active	0	0	0	0	0	0	0	0	0	0	0	0	0

\* With evidence of excess Ca deposit.

from 2 to 6 months. The cows were turned out for 3 hours daily into a shady orchard where there was no grass, and both the experimental group and the control group were fed on 20 per cent grain ration with mixed hay. The experimental group of cows was irradiated for 2 weeks before their milk was used for the studies and the irradiation was continued over the entire 9-month period.



Showing irradiation of cows with carbon arc lamps

The arrangement of the lamps with respect to the cows which were being irradiated is shown in Figure I.

FIGURE I

Cow	Lamp	Cow	Cow	Lamp	Cow	Cow	Lamp	Cow
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It will be noted from the diagram that it was possible to irradiate 6 cows at once with this arrangement of stalls and lamps. The stalls were formed by the use of 2" pipe set into the yoke rack at the front and extruding almost horizontally to the rear where the pipe was bent downward and fixed into the floor. The accompanying photograph illustrates the method of irradiation. The cows could be brought in or taken out without touching or moving the lamps, thereby keeping them in operation continuously and affording a quick and easy method of irradiating a large number of cows in a short period of time.

The lamps were hung so that the arc formed between the two carbons was opposite the under side of the cow's body about midway from front to back. A good exposure of the udder side and the more tender portions on the under side of the body was thus obtained. The

TABLE III  
SUMMARY OF UNITS OF VITAMIN D IN MILK PREPARED IN VARIOUS WAYS  
BY DIFFERENT INVESTIGATORS

<i>Treatment</i>	<i>Units per Liter Milk</i>		<i>Results in Infants</i>
	<i>Steenbock</i>	<i>U.S.P.</i>	
<i>Irradiated ergosterol to cow</i>			
Hess 100,000 units to cow	80	800	Complete protection
200,000 units to cow	160	1,600	Complete protection
Kraus 100,000 units to cow	67	670	—
200,000 units to cow	100	1,000	1 qt. $\approx$ 1/2 teaspoon C.L.O.
<i>Irradiated yeast to cow</i>			
Hess 30,000 units to cow	80	800	Partial protection
60,000 units to cow	160	1,600	Complete protection
<i>Irradiation of milk</i>			
Hess—carbon arc	50	500	Complete protection
<i>Present study</i>			
Irradiated milk—carbon arc	65	652	Protection
Non-irradiated milk	6	60	—
Milk from cows irradiated with carbon arc	20	200	Protection
Milk from non-irradiated cows	5	50	—
Irradiated yeast to cow—200,000 units	160	1,600	—
<i>For comparison</i>			
3 teaspoonfuls cod-liver oil	200	2,000	Complete protection
10 drops viosterol	800	8,000	Complete protection

arcs were about 25" from the cows, at which distance the total ultra-violet intensity between the range of 2,000 to 4,000 Angström units was 6,400 micro-watts per sq. cm., or 640 ergs per sq. mm.

Each cow was irradiated for 15 minutes each day on one side only.

The assays upon the two separate rat colonies mentioned showed an average number of 22 units of vitamin D per quart of milk from the irradiated cows. The milk from the control group of cows showed an average of 5 units of vitamin D per quart of milk.

Table II records the results of the protective experiment upon 21 infants over a 6- to 8-month period; practically parallel to the infants fed upon irradiated milk. The same rigid requirements for clinical and X-ray diagnoses were maintained and a protective record almost equivalent to the infants fed irradiated milk may be noted in this table.

In addition to this protective study with milk from irradiated cows we have been much interested in determining the curative potency of such milk and have been surprised to find a similar curative power in infants with florid rickets. The laying down of the calcium in the zones of temporary calcification has been slower than with other anti-rachitic agents, but the bones have proceeded to complete healing. These infants have been followed in the hospitals mentioned and the blood calcium and phosphorus determinations have corresponded with the progress of the healing bones.

We prefer to obtain more data including both protective and curative experiments before making conclusive statements upon the anti-rachitic potency of milk from irradiated cows because of the previously unfavorable reports. However, we feel sanguine of its protective value. In Table III are listed the vitamin D units obtained by various investigators and including the present studies upon vitamin D fortified milk.

#### COMMENT

Our findings, particularly those concerned with the milk from irradiated cows, suggest that an even greater discrepancy may exist between the rat assays of antirachitic agents and their clinical value in the prevention and cure of human rickets. The prevention of rickets in a group of 21 infants under hospital control by means of 22 units of vitamin D per quart of milk from irradiated cows, would appear to necessitate further investigations of the unmeasured factors involved and further studies of the vehicles used for administration of vitamin D.

From the table which Hess and Lewis<sup>1</sup> published concerning irradiated milk, it is quite obvious that a number of the youngest infants they studied must have been receiving only 35 to 40 units of vitamin D per day, and yet the protection recorded was highly satisfactory. This number of units is not far in excess of the number of units of vitamin D administered to our group of 21 infants fed upon milk from irradiated cows.

Direct irradiation of milk can be carried out only where larger pasteurizing plants are available. In such places this would seem the method of choice, since it would afford, particularly to those of moderate means, a potent source of vitamin D at a cost only slightly above that of ordinary milk and at the same time assure its reaching the infant. Irradiation of the cow has certain advantages over this method. The danger of change of taste, alteration of chemical nature, destruction of other vitamins and some contamination by handling are all eliminated. It is equally suitable for use in those carefully controlled herds producing certified milk and herds in smaller communities producing a good grade of raw milk. Either method offers an appreciable saving of expense for institutions caring for a large number of infants such as that in which these experiments were conducted.

"Yeast milk" though higher in number of vitamin D units, is apparently no more efficacious per quart of milk for protection and is more expensive to produce.

We have had no experience with the method of adding vitamin D directly to the milk. We are interested now in comparing this method to those above, with especial reference to the number of Vitamin D units necessary to obtain equivalent results.

#### SUMMARY

The discrepancy has been emphasized again between the rat assays of antirachitic agents and the protective and curative value of such agents for human infants.

Three types of vitamin D fortified milk were studied; namely (a) irradiated pasteurized milk, (b) "yeast milk," and (c) milk from irradiated cows. Parallel studies were conducted on rats with all three types, and studies on infants with the first and third types. Some curative studies, however, were made upon infants with "yeast milk," the second type.

The amount of vitamin D by assay and the protection afforded infants against rickets by the first two types were found to be equivalent in most respects to the favorable results reported by other investigators.

Preliminary investigations of milk from irradiated cows, both by rat assay and by protective and curative experiments on human infants would suggest a definite increase in vitamin D potency over the milk from control cows. Twenty infants over a period of 6 to 8 months were protected from rickets by this antirachitic agent alone. One infant in the foundling home and a small number of other infants with definite rickets were cured by this same agent alone. We do not regard these data as conclusive until the group of infants has been followed for a longer period.

The rat assay on milk from irradiated cows approximated 22 units of vitamin D per quart of milk. The apparent effectiveness in preventing rickets in infants by such a small number of vitamin D units emphasizes the importance of certain unknown and unmeasured factors in vitamin D fortified milk which deserve further consideration and study.

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**T**UBERCULOSIS has been aptly termed the "Foe of Youth" and to fight this foe is the important work which more than 2,000 affiliated tuberculosis associations all over the country carry on throughout the year. It is to maintain this work and to continue to promote the organization of measures that will prevent the untimely death of so many thousands of our young people, that the penny Christmas seals are sold each year at this time. Each year brings improvement and with it the chance for a longer, happier life for all of us.—N. T. A., New York.





# A Study of Lobar Pneumonia in Massachusetts: Methods and Results of Pneumococcus Type Determination, 1931-1932\*

RODERICK HEFFRON, M.D., AND FLORENCE M. VARLEY

*Pneumonia Study and Service, State Department of Public Health, Boston, Mass.*

EARLY in 1931 a study of lobar pneumonia in Massachusetts was begun. This study,<sup>1,2</sup> financed by the Commonwealth Fund of New York City, comprises a study of the epidemiological factors involved in the spread of the disease; the production of concentrated antipneumococcic serum for treatment; and the organization of various areas of the state, selected by our Advisory Committee on Lobar Pneumonia. In them pneumococcus typing can be carried out so that patients may receive the benefits of early serum treatment.

Eleven selected areas have been organized embracing a population of about 2 million or approximately one-half that of the state. They include urban, rural, industrial, residential, seashore, and upland regions. It was decided to use the laboratories of the one or more centrally located hospitals of each area as the typing center for that area. The present paper will deal with the findings of the 20 laboratories coöperating in this work.

In order to obtain uniform and proficient technic in this work, the technicians were sent to Boston and trained in pneumococcus typing at the Boston City Hospital. Typing is carried out for Types, I, II, III and V (V, because of occasional cross-agglutinations with Type II). Pneumococci other than I, II and III are reported as Group IV. Cultures of Group IV are sent to the State Bacteriological Laboratory where typing is carried out to the full 32 (Cooper<sup>3</sup>) types, to determine their geographical distribution and frequency. Incidentally, this affords a measure of checking the accuracy of the typing in the outlying laboratories, for if a culture is sent in as a Group IV and turns out to be a I, II, or III, it is obvious that an error has been made.

A set of directions was drawn up and copies were supplied to each

\* Read before the Laboratory Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 24, 1932.

## Krumwiede and Mouse Typing

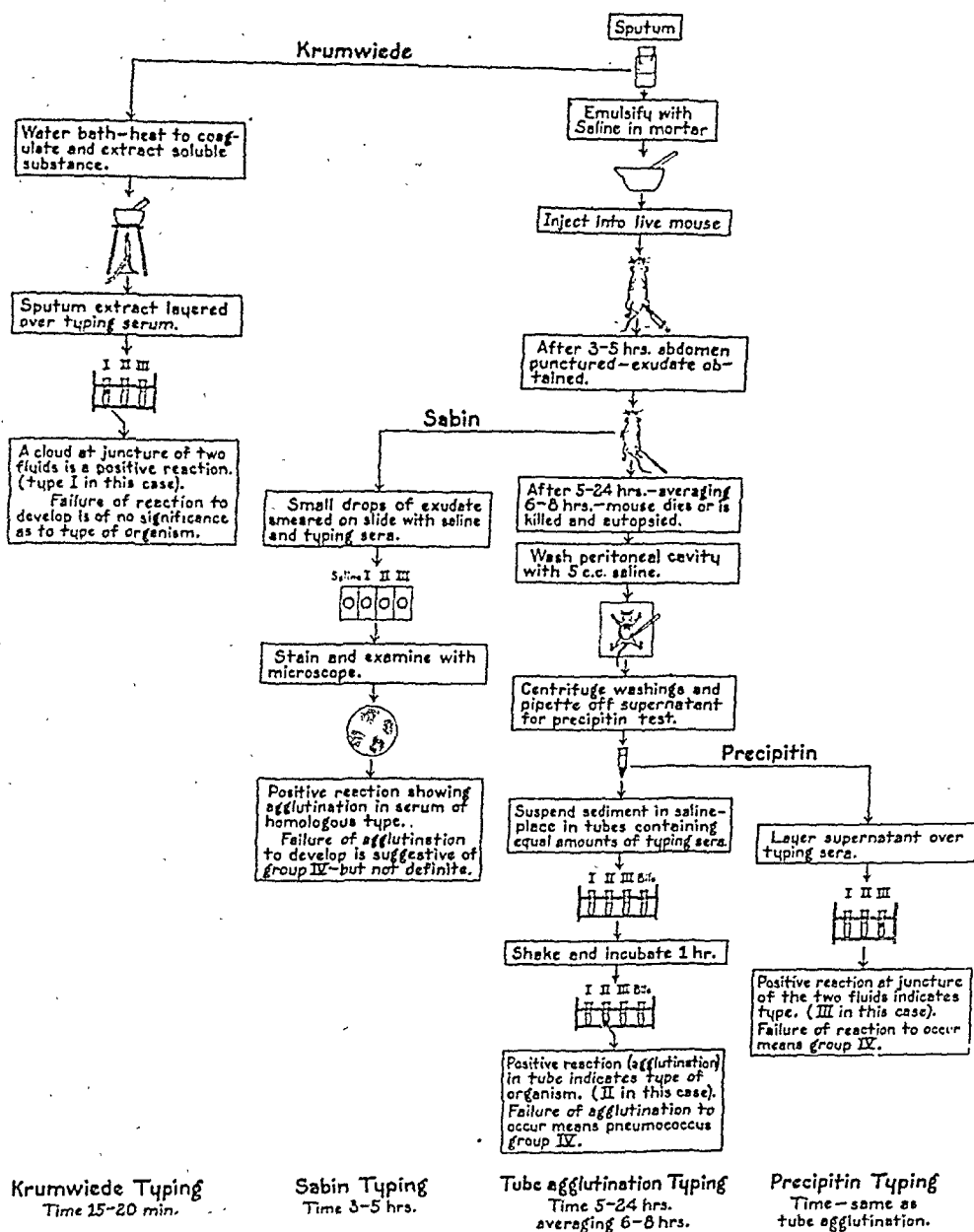


FIGURE I

technician. These give detailed procedure for typing sputum by the Krumwiede,<sup>4</sup> Sabin,<sup>5</sup> tube agglutination and precipitin methods<sup>6</sup>; and for typing material obtained from blood, throat, and other cultures, spinal and chest fluids, pus, and urine. The use of white mice in typing sputum and other suitable material has been adopted.

Given sputum, the technicians have been requested to try on each.

specimen the Krumwiede, Sabin, and tube agglutination methods in the order named. Either the Sabin or tube agglutination acts as a check on the result of the previous method employed. An attempt was made to have every typing in these outlying laboratories checked by typing the organisms obtained from cultures of the mouse's heart blood or peritoneal exudate in plain or blood broth, or on blood agar plates. This has been done in some laboratories and neglected in others.

To familiarize the physicians of the state with some of the methods of typing sputum and urine, two sheets of illustrations showing schematically the methods used and the usual time necessary to perform each have been distributed at large (Figures I and II).

#### TYPING RESULTS IN OUTLYING LABORATORIES

The number of typings in the laboratories of the areas over the state during the past fall, winter and spring is as follows:

<i>Area</i>	<i>Number of Typings</i>
(1) Beverly	30
(2) Malden	43
(3) Chelsea	(data not available—small number)
(4) Newton	45
(5) Boston	204
(6) Brockton	19
(7) New Bedford	13
(8) Ayer	32
(9) Worcester	122
(10) Pittsfield	10
(11) Great Barrington	3
Total	521

Areas 2, 7 and 9 were not organized until well into the winter.

The distribution of types was as follows:

Type I	79
Type II	26
Type III	50
Group IV	362
No pneumococci	
Streptococci	
Friedländer's bacilli	
Total	517 *

\* This figure is smaller than the total of 521 typings attempted because 5 specimens were urine. These gave negative precipitin reactions.

At first no request was made that cultures of all Group IV be sent to the State Bacteriological Laboratory for further typing. During the early winter such a request was made, and since cultures of most of Group IV have been obtained.

One hundred and seventy-one cultures have been received from the outlying laboratories and typed out to the full 32 types. (Table I.)

TABLE I  
RESULTS OF EXAMINING AND TYPING SPUTUM, CULTURES AND OTHER MATERIAL  
AMONG THE THREE LARGE GROUPS

Type	Cultures from Outlying Labora- tories	Sputum Sent in by District Health Officers	"Regular" Typings	Type	Cultures from Outlying Labora- tories	Sputum Sent in by District Health Officers	"Regular" Typings
I	3 *	9	84	XXII	0	1	6
II	0	2	33	XXIII	1	0	6
III	4 †	6	82	XXIV	0	0	3
IV	8	1	16	XXV	0	0	0
V	13	6	31	XXVI	1	0	4
VI	2	0	4	XXVII	0	0	1
VII	4	4	16	XXVIII	0	0	4
VIII	13	9	40	XXIX	5	1	4
IX	3	4	16	XXX	0	0	4
X	9	2	12	XXXI	3	0	6
XI	2	0	20	XXXII	0	0	0
XII	1	1	5				
XIII	2	0	8	Miscellaneous	60	..	..
XIV	2	0	6	No pneumococci	..	17	134
XV	0	0	2	"Group IV"	..	4	77
XVI	0	0	1	<i>Strep.</i>			
XVII	2	1	7	<i>hemolyticus</i>	9	2	31
XVIII	8	1	16	Friedländer's			
XIX	8	1	15	bacilli	2	1	7
XX	6	0	9	Untyped			
XXI	1	0	3	pneumococci	..	..	3
				Total	172 **	73	716
				Grand total all typings			960

\* 1 sent for corroboration

† 3 sent to see if they were VIII

\*\* 1 culture gave cross-agglutination with X and XX serums and is reported in both types.

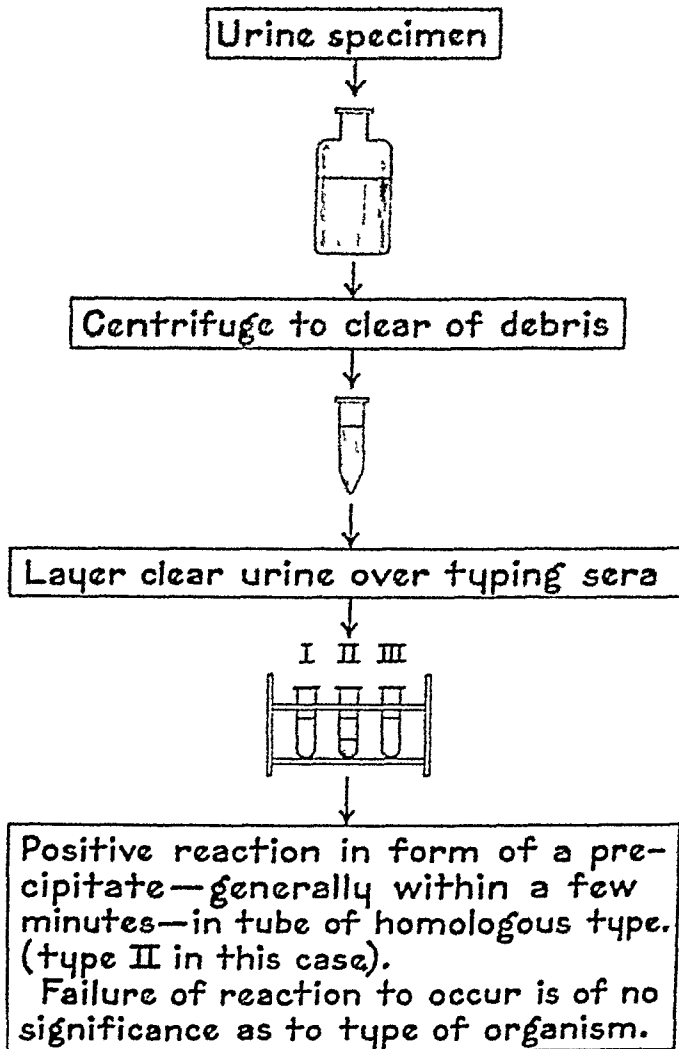
Among the cultures sent in, only 2 of Type I and 1 Type III were sent in as Group IV.

#### STATE BACTERIOLOGICAL LABORATORY TYPINGS

During the past year typing has been carried out to the full 32 known types at the State Laboratory on all material sent there for this purpose. In the spring the demand became so great that an additional bacteriologist was taken on for this work.

The typings at this laboratory during the past year may be divided into 3 groups: (1) those done on Group IV cultures sent in from the outlying laboratories, (2) those on sputa sent in by the District Health Officers associated with this department, from

# Urine Typing



**Urine precipitin typing**  
Time—15-20 minutes.

FIGURE II

patients with lobar pneumonia cared for at home, and who are not receiving antipneumococcic serum, (3) the group of "regular" typings carried out on material of various sorts sent directly by physicians at large. (Table I.) The specimens in this last group have not all come from cases of lobar pneumonia; many are from cases of broncho-pneumonia and other respiratory diseases; conse-

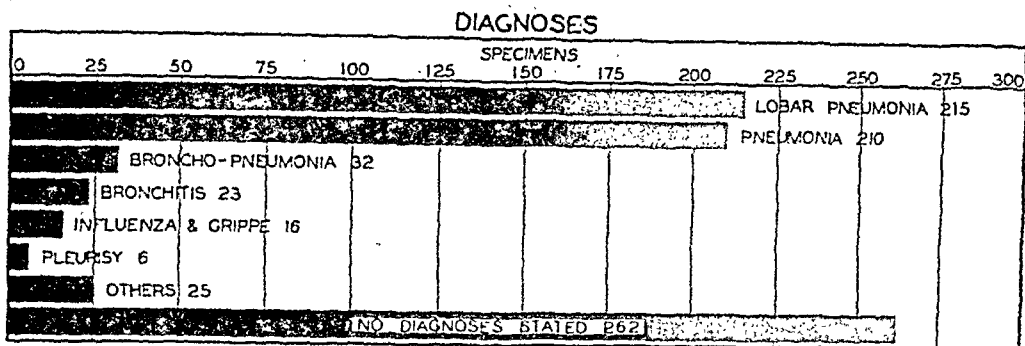


FIGURE III

quently, the frequency with which any particular type is observed cannot be compared with the reported occurrence of various types as the etiological agents in cases of lobar pneumonia alone. (Figure III.) This group represents a true picture of the variety of materials from hundreds of cases sent for typing by physicians of this state, and probably yields a picture similar to that which may be found by other state laboratories undertaking such work, and gives definite evidence that in Massachusetts, nearly every known type of pneumococcus can be found associated with respiratory disease.

Every specimen of sputum, chest or spinal fluid, or pus, received for typing which has yielded good pneumococci has been typed by one or more methods, and a vigorous attempt made to check each by cultures from the heart's blood of the mouse in plain or blood broth or on blood agar plates.

The routine methods employed on sputa have been (1) Krumwiede, (2) Sabin, and (3) tube agglutination, with or without precipitin test. (The final report to the physician on the result, if not previously rendered, was given here.) (4) In a few cases, typing has been done from heart's blood cultures, where the above methods have failed, (5) Occasionally, typing has been done from individually fished colonies.

The Sabin and tube agglutination (with or without the precipitin test) methods were used on chest or spinal fluids and pus. They were also cultured in broth and on blood agar plates directly.

On sputa, frequently the first 3 were done before checking from cultures, in order that an attempt might be made to evaluate the speed, accuracy and applicability of these various methods. The results will be discussed later.

A list of the organisms found in the sputa obtained from patients with lobar pneumonia who were cared for at home will be seen in Table I. These specimens were sent by the District Health Officers, and came from widely separated areas of the state. Data

concerning the case fatality rates, incidence of complications, and so forth, are being gathered upon this series which will give definite information upon this particular group of little known and much debated cases.

In Table I it will be noted that the term "Group IV" appears near the bottom of the table. In all such instances the specimens were inoculated into mice. Pneumococci could be seen in the mouse peritoneal exudate, but due to the overgrowth of other organisms, which increased in numbers upon further cultivation and exterminated the pneumococci, they could not be classified as to type. Unfortunately, the number of such was rather large.

If no pneumococci could be seen in direct smear of the mouse exudate, the report was "No pneumococci found." Hemolytic streptococci and Friedländer's bacilli were never reported, the former because they occur so often in normal throats their significance is uncertain, and the latter because there was no diagnostic serum available for the types known to be pathogenic for man. Such agglutinating serum has been obtained and henceforth Friedländer's bacilli will be reported. Records were kept where they were found and these findings are included here. No record has been made of *S. viridans*, nor of *B. influenzae*, when found. These organisms have occurred in varying numbers and there is great doubt of their clinical significance in the numbers found.

The third and last group of typings is the so-called "regular" done on sputum and other specimens sent directly to the laboratory. The results give an excellent gross picture of the variety of organisms likely to be encountered.

Among the "regular" typings the specimens upon which typing was requested were as follows:

	<i>Number</i>
Sputa	691
Chest fluids	8
Urines	7
Spinal fluids	5
Cultures of blood or pus	5
Total	716

It must be emphasized that the above specimens did not all come from cases of lobar pneumonia, but from many sorts of respiratory disease. The organisms reported are given in Table I.

The group of "regular" typings in Table I includes 15 instances where 2 types were isolated from the same specimen or definite cross-agglutination between 2 types occurred. These are reported under both types. The results of examination of 7 urines negative for I,

II and III, and of 8 specimens in which too few pneumococci were found to be typed are not included.

Summarizing the results of the "regular" typings noted in Table I, the distribution of the specimens as to organisms found is:

	Number	Per Cent
Pneumococci Types I to XXXII	464	64.7
Reported as "No pneumococci found"	134	18.7
Reported as "Group IV" pneumococci	77	10.8
Streptococcus hemolyticus	31	4.3
Friedländer's bacilli	7	1.0
Pneumococci—typical—but could not be typed with any of the 32 diagnostic sera available	3	0.4
Total	716	99.9

### SEASONAL INCIDENCE

In an effort to determine the relative frequency with which the various types of pneumococci and other organisms occurred during the different seasons a series of charts have been prepared on which their monthly incidence has been recorded for 11 months, September 1, 1931, to July 31, 1932. Two groups of specimens have been combined. The results from sputa sent in by the District Health Officers have been added to those of our "regular" typings, as all of these specimens were sent to the laboratory directly from patients. (No Group IV cultures from outlying laboratories are included.)

The following charts (Figures IV to VII) give occurrence by months of the various organisms found in percentages, and show the

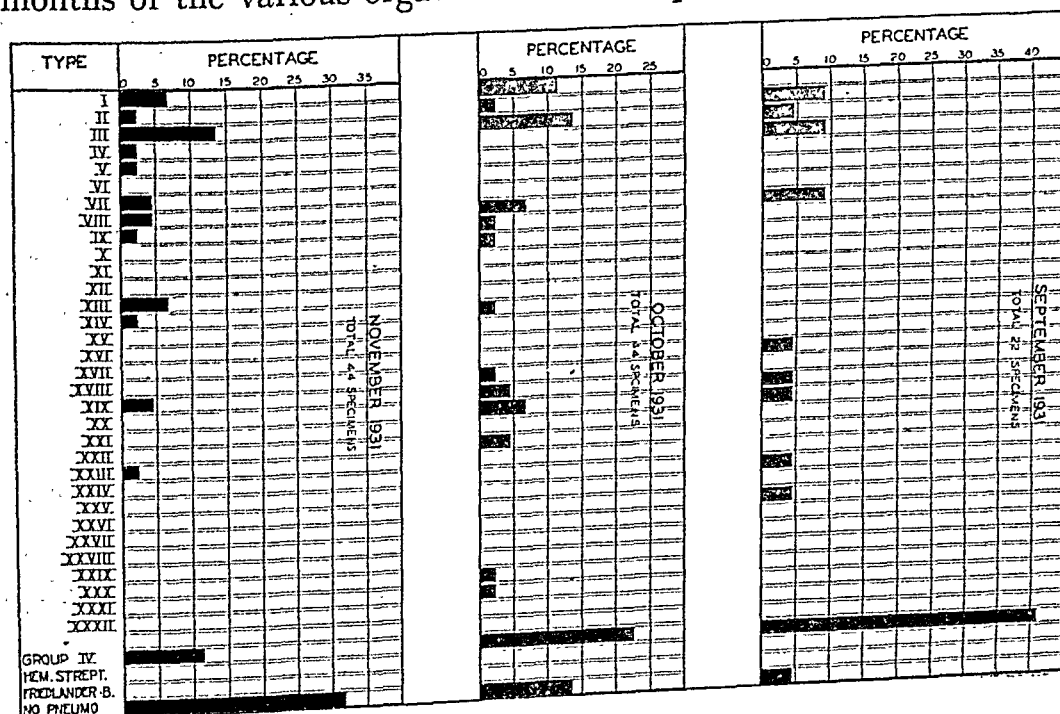


FIGURE IV



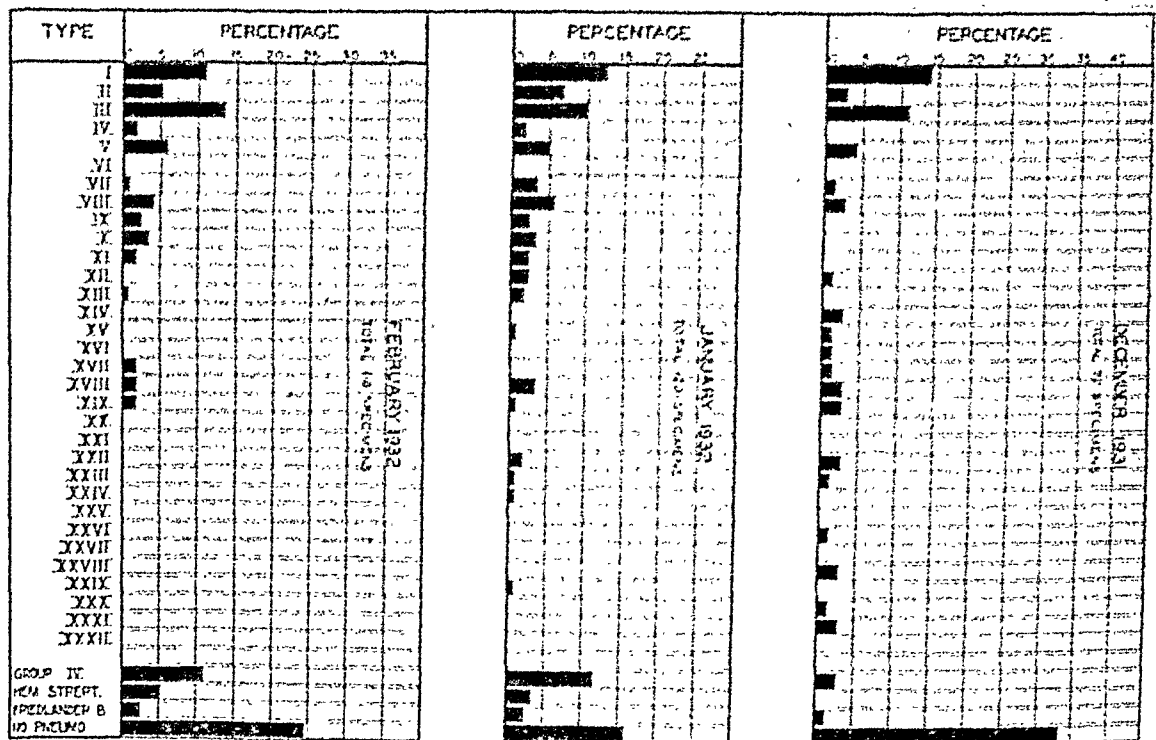


FIGURE V

results of typing 789 specimens. The various sub-types (IV to XXXII) were found more frequently during the winter and spring months December to May, than during the warmer months.

The approximate figures for this may be found in Table II. It will be noted that the percentage incidence of the sub-types (IV to

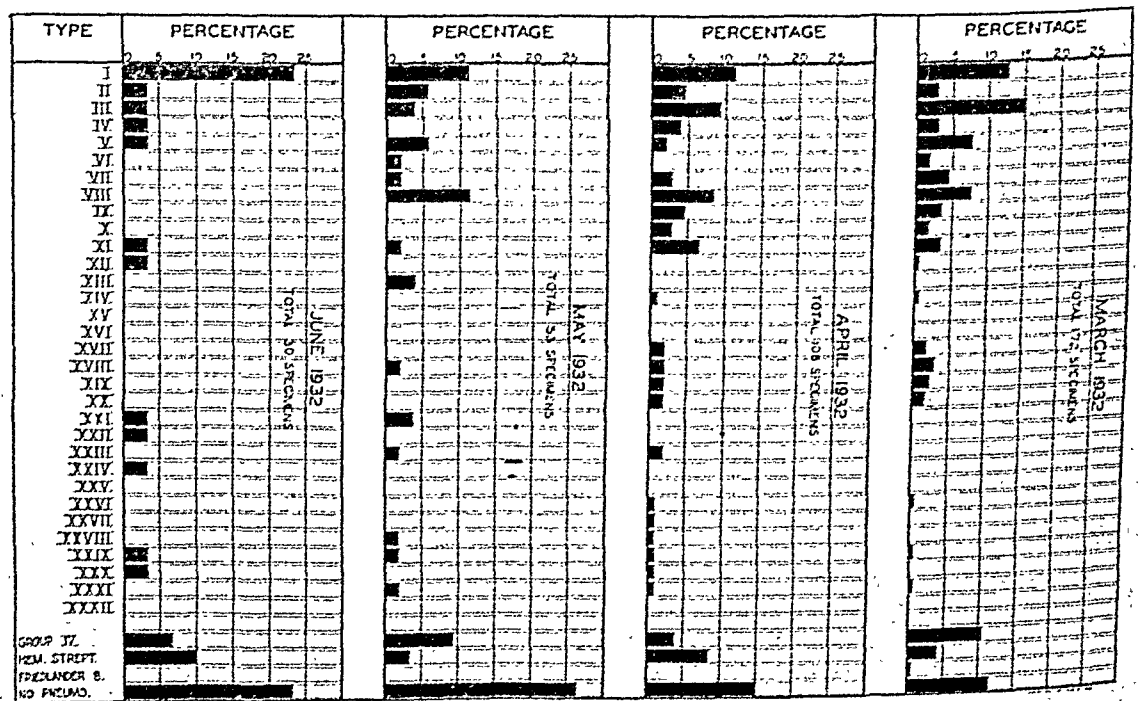


FIGURE VI

XXXII) remains more constant than does the actual number of different sub-types found; also, that Types I, II, and III comprise less than a quarter of the total 11 months' yield at the State Laboratory. There is every reason to believe that the figures for I, II, and III would be much greater were these typings done on consecutive cases of lobar pneumonia only.

TABLE II

Month	Percentage of Types Found (Approximate)		Percentage of Group IV and Other Organisms (Approximate) Per Cent	Actual Number of Different Sub-types Found
	I, II and III Per Cent	IV to XXXII Per Cent		
Sept., 1931	13.6	40.7	45.4	7
Oct.	27.3	36.2	36.3	10
Nov.	22.6	31.7	43.2	9
Dec.	27.8	35.0	37.5	16
Jan., 1932	29.2	37.3	33.2	16
Feb.	30.5	26.1	43.2	11
Mar.	30.7	43.1	26.8	17
April	25.4	46.4	27.4	19
May	20.8	39.8	39.6	12
June	29.9	29.7	40.0	9
July	0.0	37.5	62.5	3
Approximate average for all 11 months	23.4	36.6	39.5	11.7

The lower chart in Figure VII summarizes the results for 11 months and shows the percentage incidence of the various organisms found September 1, 1931, to July 31, 1932—a total of 789 specimens including 764 sputa, a few chest and spinal fluids, a few urines, and blood cultures.

#### GEOGRAPHICAL DISTRIBUTION OF TYPES FOUND

There has been no especial geographical distribution among any of the 30 types of pneumococci found. The same type was isolated from individuals ill at the same time in widely separated regions of the state without apparent contact having occurred between the hosts.

Every type of pneumococcus (Cooper types), excepting XXV and XXXII, has been found among the specimens sent to the State Laboratory.

#### MULTIPLE FAMILY CASES OF LOBAR PNEUMONIA

Instances where 2 or more members of the same family have had lobar pneumonia within a few days or weeks of each other due to the same type of pneumococcus, have been decidedly uncommon and occurred only four or five times among nearly 1,000 cases typed either by our collaborators or at the State Laboratory.

## ACCURACY OF TYPING METHODS

It is difficult, if not impossible, for us to give other than an estimation of the accuracy of the various methods of typing used. It is our experience that when the results of a typing by the Krumwiede, Sabin, or tube agglutination method are definitely positive, they are over 99 per cent accurate. The reporting of indefinite results leads to error and is to be discouraged.

The following figures throw light upon this attempt to estimate accuracy. The number of typings by the method used and the number of these checked by another method or by culture is indicated. Where a definite type has been determined and later yields a different one (not including cross-agglutinations and specimens with 2 types) on culture, such findings are indicated as discrepancies and for all practical purposes may be counted as errors in typing.

Typing Method	No. of Specimens Yielding Types	Total No. of Typings Checked	
		Those in Agreement with Original Type Found	Those NOT in Agreement with Original Type Found
Krumwiede	57	53	3
Sabin	380	360	4
Tube agglutination	150	143	2

The Krumwiede takes from 30 to 60 minutes. The Sabin usually gives positive results in 5 to 8 hours. The tube agglutination and/or the precipitin method can be done from 6 to 24 hours after inoculation of the mouse.

## ADVANTAGES AND DISADVANTAGES OF METHODS

*Krumwiede method of typing sputa:* This method, when positive, yields a very speedy result. Usually, however, it has been found that the sputa sent to the State Bacteriological Laboratory for typing are insufficient in amount for this method, or when boiled become cloudy or otherwise unsatisfactory. For these reasons the usefulness of the Krumwiede has been greatly decreased. With some attention paid to the gathering of suitable specimens in satisfactory amounts it should be possible to increase greatly the number of positive typings by this very valuable rapid method.

Figure VIII shows the small number of positive Krumwiedes obtained from 683 sputa, being only 7.9 per cent of the whole (Krumwiedes were not done for Types IV to XXXII). The method yielded 30 per cent positives for I, II, and III among those sputa

from which a satisfactory supernatant fluid for layering was obtained. For any individual laboratory, in close association with patients, it should be possible to better this record with ease.

The results of the Krumwiede method of typing among sputa later proved to contain Type I, II, or III pneumococci are shown in Table III.

TABLE III  
RESULTS OF TYPING BY VARIOUS METHODS

Results with specimens containing	Krumwiede				Sabin				Tube Agglutination			
	No. of specimens available	No. tried	No. positive	Per cent positive among those tried	No. of specimens available	No. tried	No. positive	Per cent positive among those tried	No. of specimens available	No. tried	No. positive	Per cent positive among those tried
Type I	89	31	24	77	83	73	69	95	44	44	40	91
Type II	35	14	12	86	27	25	24	96	12	12	11	92
Type III	74	27	18	67	63	54	51	95	34	34	31	91
Types IV to XXXII inclusive	...	...	...	...	255	253	232	92	93	74	66	89

*Sabin method of typing specimens:* In our experience this method will give a positive result on the largest number of specimens (sputa, chest, or spinal fluids, pus, and so forth) in the shortest period of time of any used; and is readily learned by new technicians.

Figure IX shows the results with this method. A total of 778 specimens were received which might have been put into mice, but due to the character and age of some this procedure was not always followed out though seven hundred and thirty-one were inoculated into mice. Sabins were not done on all of these for various reasons, the principal one being that in a large number of cases examination of the mouse exudate showed a very mixed growth or no pneumococci. Of the 731 specimens, 448 were tried with typing sera (this number includes 43 which never yielded a pneumococcus of any kind and 7

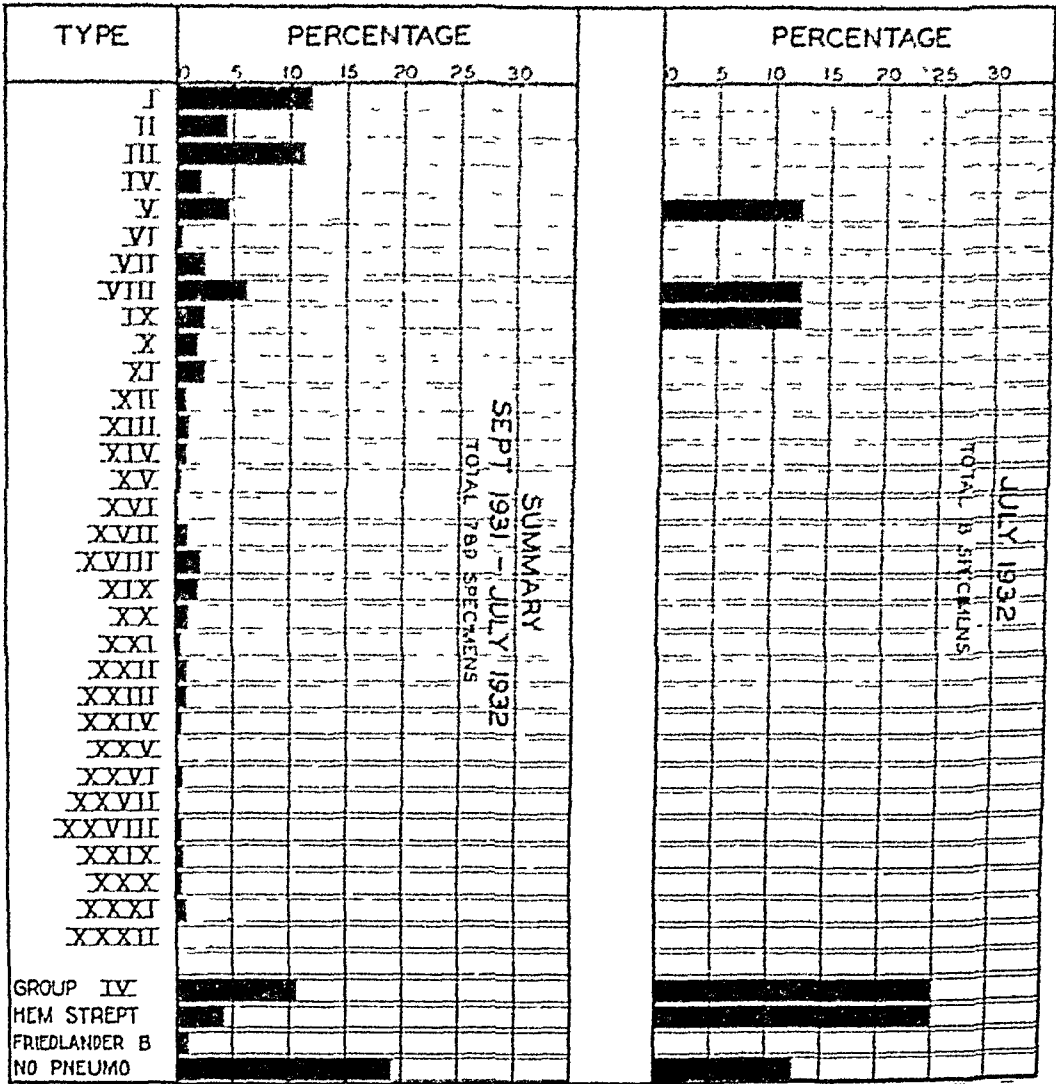


FIGURE VII

tried only for I, II, and III which later yielded a higher type). Of the 778 specimens, 376, or 48.3 per cent, gave a positive result for some type, or 83.9 per cent of those tried. Of those tried, 22 were negative and later on culture or tube agglutination yielded some definite type.

In estimating the efficiency of the Sabin method it is found that

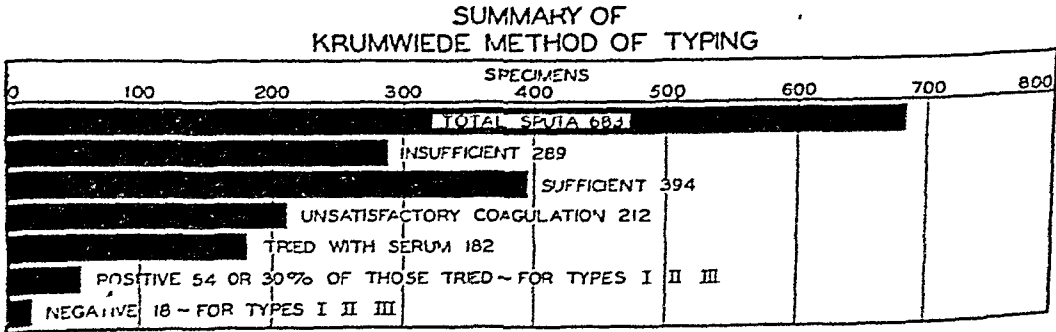


FIGURE VIII

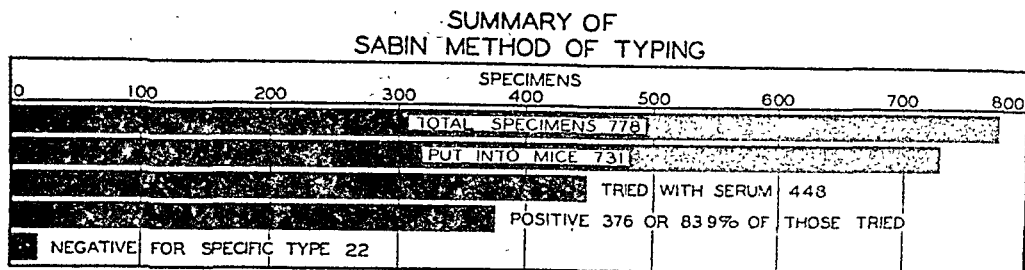


FIGURE IX

among 398 specimens that contained some definite type of pneumococcus, 376 or 94.5 per cent gave a positive result.

The results of the Sabin method among specimens proved to contain pneumococcus of some definite type (from I to XXXII) may be seen in Table III.

*Tube agglutination method of typing:* This method offers no particular advantage except in occasional instances where the Sabin has been negative, due chiefly to the presence of mixed culture. Of course, the tube agglutination is an old and well tried method and as such has rendered, and still does render, invaluable service. The great disadvantage lies in the fact that so much time is required for its performance.

Owing to the lack of time during the past year tube agglutinations were omitted on some specimens when satisfactory results were obtained by the Krumwiede or Sabin. These were checked by cultures, usually heart's blood cultures from the mouse. There were 273 specimens on which our records for tube agglutinations are complete. (See Figure X.) Of these, all 273 were tried. One hundred and forty-eight or 54.2 per cent were positive which is also 54.2 per cent of those tried. Sixteen of the negatives contained some specific type. Of the remaining 109, 90 never yielded a definite type by any method and the others were not typed out far enough to include the specific type later obtained from culture.

The results of tube agglutinations among specimens proved to contain pneumococci of some definite type (I to XXXII) are shown in Table III.

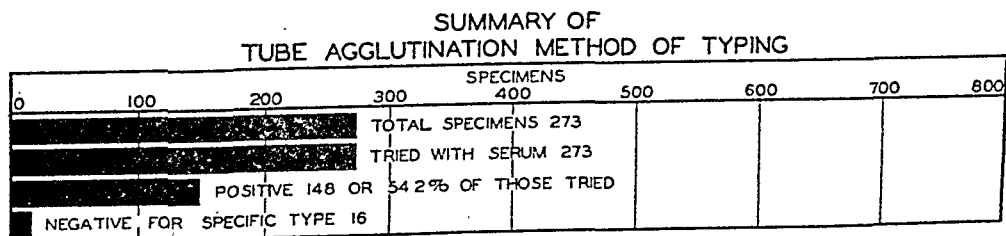


FIGURE X

*Other methods of typing:* The precipitin test as an aid to typing (using the supernatant of centrifuged mouse peritoneal exudate washings) has been used occasionally and was most useful where the mouse peritoneal exudate contained other organisms with the pneumococcus.

Occasionally Avery broth cultures (the so-called artificial mouse method of typing) have been made simultaneously with mouse inoculations, using the same specimen. Such data are being collected and will be reported later.

#### CHECKING BY CULTURES

Efforts were made to check every type previously determined from a culture of the organism. Among 789 typings only 43 or 5.4 per cent were not checked by either some other method of typing or by culture, and most of these were checked from cultures of the organism. The majority of such cultures were made from the heart's blood of the mouse in plain or blood broth or on blood agar plates. Most of those not checked could not be typed by any rapid method due to the presence of other organisms; the type was ascertained from cultures of individually fished colonies or cultures of the heart's blood of the mouse.

#### MISCELLANEOUS FINDINGS

Two distinct types of pneumococci have been isolated from 4 specimens, culture of the mouse's heart blood yielding a different type from that obtained by one or more of the rapid methods of typing. In each case both types were obtained by more than one method. In 3 other instances pneumococci have been found in conjunction with another organism, both in the mouse's peritoneum and in the heart's blood culture. The list follows:

##### PNEUMOCOCCUS TYPES OR OTHER ORGANISMS

<i>Number</i>	<i>Type</i>	<i>Type</i>
1	III from peritoneal exudate;	XX from heart's blood
1	III from peritoneal exudate;	V from heart's blood
1	IX from peritoneal exudate;	V from heart's blood
1	I from peritoneal exudate;	II from heart's blood,
2	III with Friedländer's bacilli	
1	IV with Friedländer's bacilli	
1	XXVI with <i>Streptococcus hemolyticus</i>	

Many of the above findings were also verified by culture of individually fished colonies. Due to the great amount of time which must be used in carrying out this type of work little has been done in this direction.

Since the figures in this article were compiled, a single Type I

colony has been isolated from the heart's blood culture of a reported Type XXII (by Sabin). The heart's blood broth culture gave a negative I and a positive XXII macroscopic agglutination. The heart's blood was also streaked on to a blood agar plate from which colonies of Type XXII and a single colony of Type I were isolated. Similarly, a strain agglutinating with both X and XI sera has been isolated from a reported Type I.

In seven other instances cross-agglutination occurred in the Sabin. Two of these strains were never obtained in pure culture. Two lost their dual characteristics upon cultivation and later agglutinated only with 1 type serum. The other 3 (isolated by single colony fishing) maintained the property of cross-agglutination for as long as they were kept, agglutinating with 2 sera both in the tube and by stirring on the slide. The types showing cross-agglutination were as follows:

- Types II and XIX
- Types IV and IX (never obtained in pure culture)
- Types VIII and XI (later, only XI)
- Types XI and XV
- Types XVI and XXVIII (never obtained in pure culture)
- Types XXVI and XXIX
- Types XXIII and XXX (later, only XXX)

#### DISCUSSION

A review of the bacteriological findings show that there has been a large amount of work done on sputum examination and pneumococcus typing. Perhaps the major difficulty encountered was that of obtaining a satisfactory specimen of sputum (or other material) of suitable quality and quantity for typing. In the outlying laboratories less difficulty has been experienced as they are in much closer association with physicians and patients than is the State Laboratory, where over 90 per cent of the specimens come by mail. Roughly, one-half of the specimens sent for typing were 24 hours old on arrival, and most of the remainder were older. Among such old specimens, as is well known, pneumococci tend to be over-grown by other organisms and die out, thus making typing difficult if not impossible, and the isolation of pneumococci in pure culture very laborious and wasteful of time. Sputa received by ordinary mail during the warm months are especially difficult to type. Specimens of satisfactory quality and quantity should be specifically requested and if specimens cannot be brought by messenger they should be sent by special delivery mail.

To carry out pneumococcus typing on a large scale, a 24-hour service is, of course ideal, but is seldom obtained. In lieu of such an ideal service, arrangements have been made in the coöperating laboratories (in the areas organized for the serum treatment of cases of lobar pneumonia) to have all specimens arriving at night for typing, injected into mice at once in order that the typing may be done in the morning by the technician. Mice dying during the night should be placed in the refrigerator so that their peritoneal exudate will not be over-grown with *B. coli*. In most instances specimens arriving in the early evening have been typed that night.



At the State Laboratory the specimens for typing are taken from cases of all sorts of respiratory diseases, of many days' duration, so that with the majority of specimens the acute need of saving a few hours of time has not arisen. Even so, there was a sufficiently large number of specimens, from early cases of lobar pneumonia in which serum treatment was contemplated, to keep the laboratory force (2 workers) very busy during the pneumonia season, often working 12 to 16 hours a day during that period (January through April). An attempt was made to check every typing by cultures of the organism, obtained chiefly from the mouse's heart blood. In some instances as many as 5 different methods of typing have been done upon a specimen to ascertain the value of each method and afford data for a comparison of the methods. Typings are now reported to physicians as "Type I," "Type II," "Type III," "Group IV—type V," or whatever the sub-type happens to be, or "Group IV—type undetermined—advise another specimen."

When 2 types are obtained from a single specimen or cross-agglutination occurs, several things can be done to clear up the problem. Another specimen of sputum should be requested and the urine typed. From the clinical standpoint, cultures of blood and/or lung puncture, with the typing of any pneumococci found, will usually settle the matter.

The Krumwiede is a very valuable method of typing in that it is a great time saver. A negative Krumwiede is of no significance and neither a tentative nor final report of Group IV should be made upon this finding. A slight hazy ring or indefinite cloudiness at the line of juncture of the two fluids in the tube is not significant and should not be reported. About one-half of these "suggestive" reactions have later proved to be some other type. Seventy-five per cent of those sputa yielding a clear liquid for layering have been positive and about 25 per cent negative, for Types I, II, and III, some one of which was later found in the specimen.

The Sabin method is the most generally satisfactory and useful for accurate and rapid determination of type. Where pneumococci are seen in the mouse exudate but show no agglutination with Types I, II, or III sera, a tentative report of "Group IV" may be made and is nearly always correct. Considering Types I, II, and III only, the Sabin has failed while the tube agglutination has yielded a type, in about 1 of 75 instances. From observations made in various laboratories this proportion of failures might be expected to be greater, as most technicians do not stir the mixture of organisms and serum sufficiently before drying it.

Usually good pneumococci give a clear-cut result with the Sabin, and in such cases it has proved safe to assume the result correct. "Naturally occurring clumps" do sometimes occur, however, in one smear only and not in the others. In such cases experience is necessary for an accurate diagnosis. If there is any question as to the reading of the Sabin, it should be repeated. The reporting of indefinite results leads to error.

If the typing is being done out to the full 32 types, all should be tried on every specimen. At the State Laboratory during the rush season, we did not always adhere to this policy and were led into some difficulty with supposed cross-agglutinations which later turned out to be clearly one of the higher types not tried at the first typing. Subsequent checking with mouse's heart blood cultures confirmed these results. (Only those cross-agglutinations which were very definite in both types are recorded in the earlier part of this paper.)

A final report of "Group IV" should not be made until after the tube

agglutination method has been carried out, with incubation and frequent shaking of the tubes for 1, or preferably, 2 hours. Both undiluted and diluted sera should be set up. Freshly isolated organisms of high virulence occasionally do not agglutinate in diluted serum; sometimes they do not agglutinate in the undiluted, probably due to the "pre-zone" phenomena.

The tube agglutination method has not proved as sensitive as the Sabin and fewer positives were obtained with it than with the Sabin.

Considering Types I, II, and III only, as these are the predominating and the ones of greatest immediate or potential interest regarding the specific treatment of illness caused by them, it is found that among a total of 216 such types found, 9 errors were made. In 6 instances the report was "Group IV" and 1 was "No pneumococci found"; in 2 a Type III was reported as a Type I,--1 on the result of a "suggestive" Krumwiede (such as were later disregarded) and 1 on the result of a tube of agglutination. Those reported as "Group IV" and "No pneumococci found" yielded, with 1 exception, mixed mouse exudates and were finally typed from mouse's heart blood cultures or from colonies fished from cultures. One yielded a practically pure culture of Type I, both from the mouse's exudate and heart's blood culture, and had failed to give a positive result either by the Sabin or the tube agglutination method.

NOTE: We are much indebted to Edith Beckler, Director, Massachusetts State Bacteriological Laboratory, for the great aid and encouragement given us in carrying out this work. Likewise, Georgia Cooper of the New York City Laboratories has been very helpful in rendering valuable assistance in many ways. We wish to take this opportunity to express our thanks to both Miss Beckler and Miss Cooper for their many kindnesses.

Much of the diagnostic sera used throughout this work was obtained from Miss Cooper in New York City.

### CONCLUSIONS

1. Pneumococcus typing is being requested by increasing numbers of physicians in Massachusetts.

2. During the past winter all 32 (Cooper) types of pneumococci excepting Types XXV and XXXII were found.

3. There was no especial geographical distribution evident of any of the types found.

4. Multiple cases of lobar pneumonia occurring in the same family at approximately the same time were very uncommon.

5. The Krumwiede, Sabin and tube agglutination methods of typing were and still are largely used and were found to be over 99 per cent accurate when definitely positive.

6. The Sabin method of typing has given a greater number of accurate positive typings in a shorter period of time than any other method studied, and is a method readily learned by technicians inexperienced in this work.

7. Of 789 specimens typed at the State Bacteriological Laboratory during the 11 months, September 1, 1931, to July 31, 1932, the type of pneumococcus found was checked in 94.6 per cent of the cases by a second method of typing or from a culture of the organism.

8. The various sub-types (Types IV to XXXII) were found more frequently during the 6 winter and spring months, December to May, than during the warmer months.

9. In view of the results to date, and until conclusive proof to the contrary is

obtained, it is felt that every type determination done by the Krumwiede, Sabin, or tube agglutination method should be checked by some other method of typing. Typing the organism obtained from cultures of the mouse heart's blood affords the most valuable means of checking.

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## The Private Practitioner and Preventive Medicine

NOTHING is more difficult than to determine the beginning or the end of great events. All we can say today is that we have been the witnesses of the greatest epoch of advance in the science and art of medicine of which there is any record in the history of mankind. Not the 5th century B.C. in Greece, nor the great 13th century in Europe, nor the Renaissance itself, can show a similar acquisition of new knowledge and its application as occurred in the hundred years following 1832. We can say even more: in no previous age has there been such growth of the conception of preventive medicine. . . .

When we reflect upon modern preventive medicine we naturally think of the change and improvement which has occurred in our external environment. We think of the great pioneers and their work for the provision of public and wholesome water supplies, for the isolation of the sick, the removal of nuisances, the reform of housing, drainage, sewerage and sewage treatment, the inspection of food, the Factory Acts, and vital statistics. Looking back we see what they did, and are more grateful than their contemporaries to Chadwick and Simon and Farr, to Bentham and the Mills, to Lord Grey, to Owen and Cobbett, to Lord Shaftsbury, and to the statesmen who took occasion by the hand. When we reflect again, our minds turn to the masters of physiology who illuminated the 19th century—to Helmholtz, Claude Bernard, and Carl Ludwig; they were followed by the masters of pathology, Virchow, Pasteur, and Koch. Perhaps we remember even the great clinicians who created and led professional opinion, Bright, Addison, and Hodgkin—the Guy's trinity—Gull and Jenner, Osler, Allbutt, and Barlow; and we wonder whether, after all, it is not the work of these eminent men which laid the foundations of prevention. Lastly, we are learning to see that preventive medicine owes an irredeemable debt to Edward Jenner, to the anesthetists Morton and Simpson, to the antiseptic principles of Lister, to the discoverers of the causes of disease, such as Pasteur, Koch, and Manson, and to the "immunizers" who followed them. . . . —Sir George Newman, *Brit. M. J.*, July 30, 1932, p. 190.

# Incidence of Tularemia in New York State<sup>\*</sup>

RUTH GILBERT, M.D., F.A.P.H.A., (*Life Member*), AND  
MARION B. COLEMAN

*Division of Laboratories and Research, New York State  
Department of Health, Albany, N. Y.*

THE apparent limitation of tularemia to certain sections of the United States is surprising in view of the great variety of animals and birds which have been shown to be susceptible to this disease. So far as can be determined, only 12 cases, enumerated in Table I, are known to have occurred in New York State, and 10 of them were attributed to the handling of rabbits either known or thought to have been imported from other states. In but 1 instance (case No. 3) was a wild animal in this state, a deer, indicated as the source of the incitant. Since no reference has been found in the literature to this species having been infected with *B. tularensis*, a brief history may be of interest.

The patient, a man, frequently butchered and skinned animals, especially during the hunting season. He handled the carcasses of raccoons and hogs 2 days after the first symptoms developed, but the information obtained indicated that there had been no opportunity for infection from these or other animals for a considerable time prior to his illness. On November 8, 1930, during a hunting trip, he injured his left index finger while handling his rifle. Later that day, he dressed a deer which he had shot, and, on November 10, skinned the animal.

On November 13 and 14, he complained of feeling ill and thought he had "grippe." Congestion and pus formation were noted at the site of the wound on his finger. Dr. A. L. Hayes of Willsboro, N. Y., the local health officer, was consulted about 3 weeks after the injury occurred. At that time, in addition to the lesion on the finger, which still persisted, a painful gland, approximately the size of a pigeon's egg, was noted in the left axilla. A clinical diagnosis of tularemia was made, and a specimen of blood, sent to this laboratory on December 2, agglutinated *B. tularensis* in a 1:320 dilution.

<sup>\*</sup> Read before the Central New York Branch, Society of American Bacteriologists, Syracuse, N. Y., June 24, 1932.

When the patient was visited on December 6 by Dr. Schleifstein, a member of the laboratory staff, his condition had markedly improved; the swelling in the gland had subsided, and the lesion on the finger was nearly healed. Washings of the ulcer in salt solution, however, were injected subcutaneously into 2 guinea pigs and some of the material was rubbed on to the abraded skin of 2 others. One of the animals inoculated subcutaneously died within 5 days. Only hemolytic streptococci developed in the cultures prepared at autopsy. Upon histological examination, however, even though streptococci were present, lesions characteristic of tularemia were found. An emulsion of the spleen was rubbed on to the abraded skin of 2 other guinea pigs, and a third was inoculated subcutaneously. These 3 animals died within from 5 to 7 days. Gross lesions typical of tularemia were noted at autopsy and *B. tularensis* was isolated from cultures prepared from the spleen.

The 12th case (No. 8 in Table I) occurred as the result of a laboratory accident. During the autopsy of a guinea pig infected with *B. tularensis*, a member of the staff broke a glass-headed push pin which pierced his finger through his rubber glove. Six days later, he became ill. The general symptoms reported were fever, chills, gen-

TABLE I

CASES OF TULAREMIA REPORTED IN NEW YORK STATE FROM JANUARY 1, 1927, TO MARCH 1, 1932

Case No.	Year	Patient's occupation	Probable source of infection	Reported by
1	1927	Club steward	Rabbits purchased for food	Murphy, J. A., <sup>1, 2</sup> Buffalo New York State Health Dept. <sup>2</sup>
2	1928	Housewife	Rabbits purchased for food	New York City Health Dept. <sup>4</sup>
3	1930	Employed in paper mill	Deer shot in New York State	New York State Health Dept. <sup>5</sup>
4	1930	Butcher	Rabbits handled in market	New York City Health Dept. <sup>6</sup>
5	1930	Butcher	Western rabbits handled in market	" " " " " 7
6	1930	Butcher	Rabbits handled in market	" " " " " 8
7	1931	Housewife	Rabbits purchased for food	" " " " " 8 Kaufman, S. M., <sup>9</sup> New York City
8	1931	Pathologist	Laboratory accident	(Described in text)
9*	1931	Butcher	Illinois rabbits	Westchester Co. Health Dept. <sup>10</sup>
10*	1931	Butcher	Illinois rabbits	Westchester Co. Health Dept. <sup>11</sup> New York City Health Dept. <sup>12</sup>
11	1931	Butcher	Rabbits handled in market	New York City Health Dept. <sup>12</sup>
12	1932	Housewife	Missouri rabbits purchased for food	Bentz, C. A., <sup>14</sup> Buffalo New York State Health Dept. <sup>15</sup>

\* These patients handled rabbits in the same market

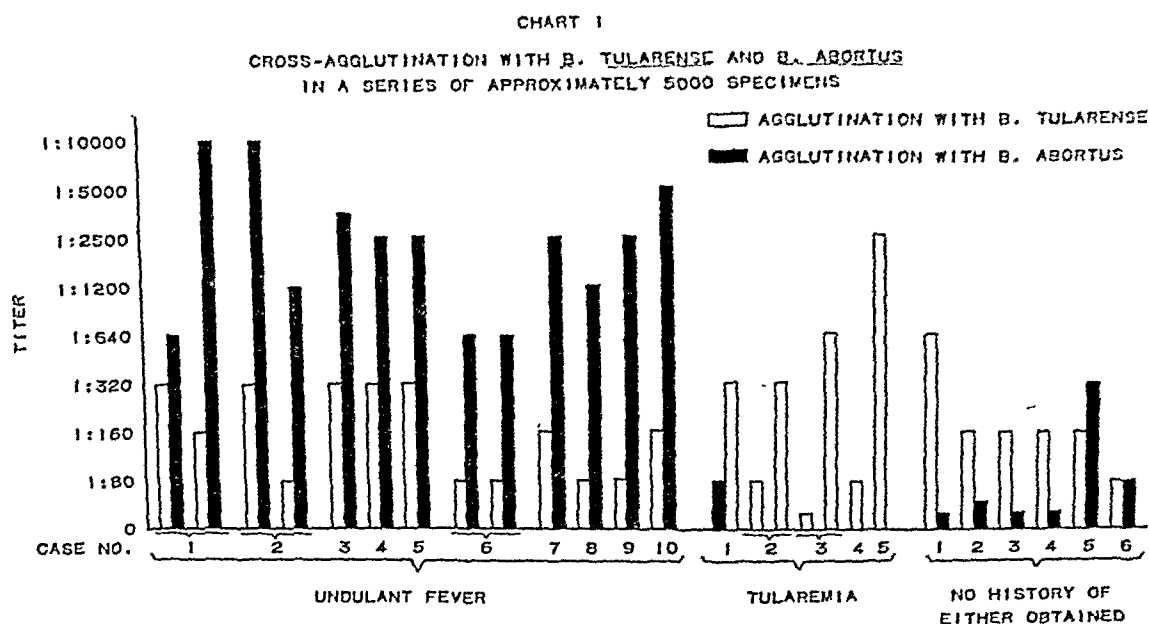
eral malaise, profuse sweating, weakness, and intense occipital headache. The temperature fluctuated from 100 to 104° C. and returned to normal by lysis 23 days after onset. No local manifestations at the site of infection, nor involvement of the regional lymph glands were observed at any time. Blood collected on the 4th day of illness failed to agglutinate *B. tularensis*, but serum obtained on the 10th and 21st days agglutinated this microorganism definitely in 1:20 and 1:640 dilutions, respectively.

Opportunities to study the agglutination reaction of *B. abortus* in serums from patients having tularemia have been limited. Serums from only 5 of the cases which are known to have occurred in this state were tested in our laboratory, 2 being those just described. That from case No. 3, which agglutinated *B. tularensis* in a 1:320 dilution, agglutinated *B. abortus* in a 1:80 dilution. The others gave reactions with *B. tularensis* in dilutions of 1:80, 1:320, 1:640, and 1:2,500, respectively, but failed to agglutinate *B. abortus* in a 1:10 or higher dilution. Francis<sup>16</sup> states that he obtained agglutination of *B. abortus* with 129, or 22 per cent, of 570 serums from patients having tularemia. In only 12 instances, however, did these reactions approximate the degree of those obtained with *B. tularensis*.

In order to secure information in regard to the occurrence of unrecognized cases of tularemia in New York State, the testing with *B. tularensis* of blood submitted for other serological examinations was undertaken as a routine procedure in 1928. The specimens selected were those which were accompanied by a history suggestive of a febrile disease or which reacted in a presumptive test with *B. abortus*. This study has also furnished further data relative to the incidence of agglutination reactions with *B. tularensis* in serums from cases of undulant fever. Francis,<sup>16</sup> who has examined specimens from various parts of the country, in many sections of which tularemia is fairly prevalent, reports agglutination of this microorganism by 31, or 33 per cent, of 93 serums from patients having undulant fever.

Among over 5,000 serums tested in our laboratory with both *B. abortus* and *B. tularensis*, exclusive of those from the 5 cases of tularemia already discussed, approximately 800 gave agglutination with *B. abortus*, while only 19, from 16 patients, reacted with *B. tularensis* in a 1:80 or higher dilution. Ten of these 16 patients had symptoms of undulant fever and their serums gave agglutination with *B. abortus* in appreciably higher dilutions than with *B. tularensis*. No clinical history of tularemia or undulant fever could be elicited in the other 6 cases. Four of the serums from these patients reacted with *B. tularensis* in higher dilutions than with *B. abortus*, the 5th had a

higher titer with the latter antigen and the 6th agglutinated both microorganisms in a 1:80 dilution. A comparison of the reactions with the 2 antigens is presented in Chart I.



Nonspecific agglutination reactions with *B. tularensis* in serums from patients in New York State having undulant fever—at least with the antigens used in this study—would seem to be almost negligible. As the serums of persons who have had tularemia are believed to retain agglutinative properties for many years, if not permanently, the small percentage of reactions obtained tends to confirm the opinion based on clinical observations, that the disease is extremely rare in this state.

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# Serology of Syphilis from the Standpoint of the Public Health Laboratory\*

With Special Reference to Precipitation Methods

JOHN A. KOLMER, M.D., DR.P.H., SC.D., LL.D.

*Professor of Medicine, Temple University School of Medicine; Head of the  
Department of Pathology and Bacteriology in the Research  
Institute of Cutaneous Medicine, Philadelphia, Pa.*

FOR various reasons the choice of a method or methods for the serological diagnosis of syphilis continues to be a problem of prime importance in public health laboratories.

In the first place, there can be no denial of the widespread prevalence of the disease, especially in the larger cities and towns, and the fact that it is one of great importance from the standpoint of public health and economics.

In the second place, it is generally admitted that laboratory examinations continue to be the chief means of diagnosis at the command of the large majority of practitioners of medicine. For the relatively few expert syphilologists, clinical training and experience in diagnosis and treatment reduce the demand and necessity for laboratory aids, but even under these circumstances everyone skilled in syphilology must admit that in the diagnosis of concealed or so-called latent syphilis and as a guide in treatment, the serological tests are indispensable. Certainly the history alone of not a few victims of the disease may be notoriously misleading and in the latent or concealed stages coincident with good general health its detection by clinical methods alone may readily escape the most expert. No one can even calculate with reasonable accuracy the incidence of unsuspected syphilis, and for the detection of these the various serological tests have played and must continue to play a very important rôle.

It is sometimes stated that the diagnosis of syphilis should never be made in the laboratory; on the contrary it is easily proved that in

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not a few instances the diagnosis of primary or acute and chronic syphilis can be made only in the laboratory. I may state therefore on the basis of both clinical and serological experience, that the laboratory tests for syphilis must continue to play a very important part in both diagnosis and treatment with the great majority of both general practitioners and specialists in medicine and surgery.

In the third place, relatively few public health laboratories enjoy the privilege of close contact with experts or clinics devoted to syphilology for checking the results of their serological work. This places upon them an added responsibility and necessity for the most accurate work with special reference to a choice of method or methods to be employed. Furthermore, the great majority of reports are sent to general practitioners who under the circumstances must accept the results and give them great weight in arriving at diagnosis and arranging therapeutic programs. A mistake in serology in either a positive or negative way may be of no great consequence to the expert syphilologist but to the less experienced physician it may be and usually is a serious matter sometimes associated with tragic consequences. I repeat therefore that all serologists and laboratories engaged in the serum diagnosis of syphilis assume a great responsibility, but in none is this responsibility quite so heavy as in the case of the public health laboratory and especially as it represents the hope and only means at the command of a large number of physicians for the aid so urgently required in the diagnosis of syphilis among indigent individuals and those who cannot afford the services of the specialist.

Of importance to all laboratories, but more especially in the case of public health laboratories without any detailed information concerning the clinical status of patients, is the question of the specificity of the serum reactions for syphilis with particular reference to weakly positive and unexpectedly positive reactions. During the active stages of syphilis with large amounts of antibody in the blood, most any of the numerous serological tests are apt to yield positive reactions and present no difficulties in diagnosis; but in concealed and unsuspected or doubtful cases the serum tests should possess above everything else a reliable practical specificity for syphilis so that proper reliance may be placed upon all positive reactions including those that are but weakly and unexpectedly positive. Under these circumstances it is proper to place the burden of proof on the clinician rather than on the serologist when the question of diagnosis is raised or disputed, and require the former to prove that syphilis is absent rather than to require the latter to prove that it is present or to seek various technical reasons and excuses for the positive reports.

Every experienced serologist knows that both complement-fixation and precipitation procedures may be made too sensitive with the risk of securing nonspecific or falsely positive reactions with the sera of non-syphilitic individuals. Personally I would much rather run the risk of securing an occasional falsely negative reaction than a single falsely positive one, and I think this attitude and practice is especially befitting the public health laboratory without the benefit of close contact with the expert syphilologist for the final evaluation of disputed results. What is particularly needed by all laboratories and especially the public health laboratory, is a test or tests possessing the maximum of specificity consistent with sensitiveness in order to earn the confidence of the medical profession in the significance of positive reactions and the great risk of error and responsibility involved in ignoring weakly positive reactions if they happen to be unexpected or out of harmony with preconceived clinical diagnosis.

As stated, the test or tests employed for the serum diagnosis of syphilis should possess the maximum of sensitiveness consistent with specificity because in the majority of instances it is in the concealed or doubtful case or treated case of syphilis with but small amounts of antibody in the blood that the aid of serum diagnosis is most urgently required.

In other words, while complement-fixation and precipitation tests serve a useful purpose in confirming the clinical diagnosis of syphilis, yet there can be no denial of the fact that they should be made especially valuable and available for the diagnosis of unsuspected or concealed cases when diagnosis is difficult or impossible by other means.

Furthermore, the maximum of sensitiveness consistent with specificity is required when serum tests are employed as guides in the amount and kind of treatment to employ. To the best of my knowledge syphilitic infection is to be regarded as present as long as reliable tests yield truly positive reactions. In some cases it may not be possible or even desirable to administer sufficient treatment to secure permanent negativity on the part of serum reactions, but yet it is to be realized under these conditions that infection persists and to take the necessary *therapeutic measures and precautions which are beyond the scope of the present discussion.*

Indeed it would appear that syphilis is not being over-treated; rather it is to be feared that in many cases it is being under-treated and the public health laboratory can do a great deal in the prevention of this very regrettable error by employing a test or tests possessing the maximum of sensitiveness consistent with specificity and encouraging their use as serological guides in treatment.

With the large number of modifications of the Wassermann and the various precipitation tests now being advocated, I can well understand the perplexity experienced by public health laboratories in the choice of method or methods to be employed.

In some instances and especially during the present difficult financial conditions, a decision may be based more upon the necessity of exercising the strictest economy than upon scientific truth or the best service. This is right and proper if not pushed to the extent of seriously involving the questions of specificity and sensitiveness. Personally I believe that it is better not to employ the serum tests at all, but to rely upon clinical judgment alone in the diagnosis and treatment of syphilis, if the serum tests are lacking in a reasonable degree of accuracy and sensitiveness.

Without doubt the precipitation tests are more economical in materials since a hemolytic system is not required, but they are hardly more economical in time as compared with complement fixation tests and certainly require an equal degree of skill and experience for their conduct. Indeed my experience as a teacher of serology has indicated that physicians and technicians can be more readily trained to do a thoroughly reliable complement-fixation test than any of the precipitation tests with which I am familiar, and especially when it involves the matter of reading doubtful or weakly positive reactions. There can be no doubt about the importance of the latter; that is to say, a serum containing large amounts of antibody and yielding strongly positive reactions and one containing no antibody at all and yielding completely negative reactions offer no difficulties in reading and interpretation, but those containing small amounts of antibody and yielding weakly positive or doubtful reactions are the ones presenting most difficulty and are most subject to error and at the same time likely to be of most clinical importance and most urgently requiring the diagnostic aid of serum tests.

In many instances those interested in the precipitation tests have sought to produce one equal in sensitiveness to the Wassermann test, but with few exceptions have not taken the trouble to employ the better modifications of the Wassermann in making their comparative tests. Without doubt some of the better precipitation tests are more sensitive than the original Wassermann reaction and some of its modifications but this is not necessarily true when the complement-fixation test is conducted with a proper antigen and a prolonged primary incubation at a low temperature in the refrigerator.

It may be that circumstances compel the adoption of a precipitation test alone for the serum diagnosis of syphilis, but I believe that

a careful and impartial review of the situation amply confirms the prevalent opinion that the serum diagnosis of syphilis is still best served by employing both a complement-fixation and a precipitation method possessing the maximum of sensitiveness consistent with specificity. And if only one test can be done I believe that a complement-fixation test employing heated serum, a sensitive antigen, and an over-night primary incubation at 6 to 8° C. is still capable of yielding the more reliable reactions in the long run.

It is not within the province of this paper to discuss the mechanism of complement-fixation and precipitation reactions in syphilis with special reference to whether or not one or two kinds of antibody are involved, but certainly experience has shown that neither alone will detect as many cases of syphilis as the two together applied to each serum and that neither alone will exclude syphilis with as much accuracy as when both yield negative reactions. Indeed, during the past several years rather strenuous efforts have been made to displace the Wassermann test altogether in the serum diagnosis of syphilis by showing that this or that precipitation test is equal or superior in sensitiveness and specificity. But as previously stated a great deal of this work has been done with little regard for the kind of complement-fixation technic employed and the whole dismissed by employing a "Wassermann test" which may or may not have been acceptable and usually not employing a modification embracing a proper antigen of acceptable sensitiveness along with cold primary incubation.

I believe therefore that those public health laboratories aiming to give the maximum of service in the serological diagnosis of syphilis cannot escape at present the necessity of conducting a reliable modification of the Wassermann reaction possessing the maximum of sensitiveness consistent with specificity along with at least one of the more reliable of the large number of precipitation tests described from time to time during the past 25 years.

When both yield positive and when both yield negative reactions the evidence is much better and the results are more confidently reported upon than when but one test is employed. But the great difficulty is how to report and interpret the results when one test yields a positive and the second a negative reaction. And this difficulty is particularly apparent in public health laboratories far removed from personal contact with the physician and patient, and more especially when the former is not in position to give an expert and reliable clinical opinion for arriving at the best conclusion in relation to the welfare of the patient.

Fortunately the majority of reactions agree in so far as positive

or negative are concerned but a certain and inevitable percentage of disagreeing reactions can prove very disturbing. Under these circumstances one may surmise that the use of two precipitation procedures instead of one precipitation and one complement-fixation test may give greater uniformity in results and solve the difficulty while being more economical in that a hemolytic system is not required; but my experience with the Meinicke, Kahn and Kline precipitation tests indicates that this is not a solution at all, as these tests applied to the same sera give a higher percentage of disagreeing reactions than any one or two of the three employed along with my own modification of the Wassermann reaction.

Of course, an easy solution of this problem is to employ only one test on the assumption that if it is properly chosen and conducted the reactions will be accurate in at least 90 per cent of sera. Under these circumstances the choice must be a matter of individual preference and decision. Personally I prefer the quantitative complement-fixation test with a superior antigen and cold primary incubation as possessing an acceptable degree of sensitiveness, a higher practical specificity and a greater ease and accuracy in the reading of weakly positive reactions than any of the precipitation tests with which I am familiar.

But my custom during the past 7 years has been to use at least one precipitation test along with my own modification of the Wassermann test as better serving the purposes of serum diagnosis. My clinical experience in the diagnosis and treatment of syphilis invariably suffices for reaching a decision in private practice when the reactions are positive with one and negative with the other, and since a certain percentage of these disagreeing reactions is inevitable, I see no escape from the conclusion that public health and other laboratories seeking to render the best possible serum diagnosis of syphilis must employ both a complement-fixation and a precipitation test and leave the final decision up to the physician when the reactions disagree.

In this connection I may state, however, that differences in the degree of positiveness should not be allowed to be a disturbing factor. A strongly positive Wassermann reaction may occur with a weakly positive precipitation reaction or the reverse. The only thing that really counts is specificity or the reliability of the positive reactions without regard to the degree which is so largely at the mercy of technical factors. Furthermore there can never be a strict correlation between the degree of positiveness of either complement-fixation and precipitation tests and the clinical status of the individual patient since symptoms largely depend upon the physiological importance of the

tissues infected while the degree of positiveness largely depends upon the degree of spirochetic activity. For example, a case of locomotor ataxia may present pronounced signs and symptoms with but weakly positive reactions, whereas a case of concealed syphilis with a heavy infection involving an organ or tissue of lesser importance may be in excellent general health with strongly positive reactions.

In so far as a choice of precipitation tests is concerned from among the large number described by Sachs and Georgi, Dreyer, Vernes, Meinicke, Kahn, Hinton, Kline, and others are concerned, my own experience has been limited so far to those of Meinicke, Kahn and Kline, with special reference to the Kahn test, which I have been employing routinely as a control on my modification of the Wassermann test during the past 7 years.

I am particularly well impressed, however, with the new or more recent modification of the Meinicke generally designated as the "clarification reaction." In a comparative study made about 3 years ago by Dr. Elizabeth Yagle and myself we found that the reactions were more definite and easier to read and interpret than the reactions of the Kahn test. Furthermore the new Meinicke was more sensitive while possessing an equal degree of specificity.

For example, in 90 carefully chosen cases of syphilis the Meinicke test yielded 77, or 85 per cent, positive reactions, whereas the Kahn gave 56, or 73 per cent, positive reactions. With the sera of 62 non-syphilitic controls both tests yielded 4, or about 5 per cent, nonspecific or falsely positive reactions.

During the past year, however, I have been particularly interested in the Kline microscopic test and have had Dr. P. Menlowe, one of my graduate students, make a particularly careful comparative study of it with the Kahn and my modification of the Wassermann test, which were conducted separately and independently by Miss C. Richter. Dr. Menlowe had the advantage of some training under Dr. Kline and used the apparatus and antigen kindly furnished by him. The tests were done and the reactions recorded with no knowledge of the clinical diagnoses or the results of the Kahn and Kolmer reactions.

With the sera of 100 cases furnished from my own practice the reactions of all three tests agreed in 91 per cent and disagreed in 9 per cent of sera. In the case of the disagreements the results have been summarized by Dr. Menlowe as follows:

	<i>Kline</i>	<i>Kahn</i>	<i>Kolmer</i>
True positive reactions:	3%	4%	6%
Falsely positive reactions:	2%	1%	0
True negative reactions:	1%	2%	3%
Falsely negative reactions:	3%	3%	0

With the sera of 1,000 additional cases drawn from the hospital and out-patient clinics of the Graduate Hospital of the University of Pennsylvania with special reference to the clinic for dermatology and syphilology of Dr. Jay F. Schamberg, the results were as follows:

In 86.7 per cent of sera the reactions of all three tests agreed in so far as positive and negative were concerned while in 13.3 per cent they disagreed.

An analysis of the latter showed the following:

	<i>Kline</i>	<i>Kahn</i>	<i>Kolmer</i>
True positive reactions:	8.7%	6.6%	7.0%
Falsely positive reactions:	1.5%	1.4%	0
True negative reactions:	1.1%	1.2%	2.4%
Falsely negative reactions:	2.0%	4.1%	3.9%

In general terms the Kline microscopic precipitation test was definitely more sensitive than the Kahn test and slightly more sensitive than the Kolmer modification of the Wassermann test. On the other hand, however, the Kline also gave more nonspecific or falsely positive reactions than the Kahn, whereas the complement-fixation test did not give any falsely positive reactions.

It would appear therefore that the Kline test is somewhat too sensitive in its present state. Certainly it is more sensitive than my modification of the Wassermann reaction but, as previously stated, I prefer to lose a bit in sensitiveness if necessary in order to preserve intact the more important question of specificity.

This is also borne out by the results observed with the sera of controls. For example, tests conducted with the sera of 35 physicians and technicians of the laboratory staff, among whom the question of syphilis could be excluded with more than usual accuracy, the Kline test gave a weak falsely positive reaction with 1 while the Kahn and Kolmer reactions were completely negative with all.

With the sera of 25 cases of acute scarlet fever, the Kline gave apparently falsely positive reactions with 6, the Kahn with 1, while the Kolmer reaction was completely negative with all.

With the sera of 21 tuberculous women among whom it was believed that syphilis could be definitely excluded, the Kline gave 4 and the Kahn 3 apparently falsely positive reactions while the Kolmer-Wassermanns were negative with all. With the sera of 4 tuberculous women believed clinically to be syphilitic, the Kline and Kahn tests gave positive reactions with all while the Kolmer-Wassermann was positive with 3.

With the sera of a group of 17 diabetics believed to be free of syphilis, the reactions of all three tests were completely negative.

In so far as a choice between the Meinicke, Kahn and Kline precipitation procedures is concerned, I believe therefore that the new Meinicke clarification test is worthy of very serious consideration. If the Kline is employed it is almost certain to yield more sensitive reactions but with the drawback of being oversensitive with the consequent danger of yielding more falsely positive reactions. Much to my regret I am not able at present to express an opinion of the Hinton and Eagle tests, which I understand are well spoken of in some localities.

Certainly it would appear advisable at present to use at least one of these precipitation tests along with a Wassermann test of proven sensitiveness and specificity. The advantage of this practice is much better appreciated in individual cases than reflected in figures and percentages, as I well know from being in the unusual position of being actively engaged in both clinical syphilology and serology. While I appreciate that strenuous efforts have been and are being made completely to displace the Wassermann test, yet I am absolutely certain that this is not possible or advisable and that public health and other laboratories can best serve the serology of syphilis by employing the Wassermann along with at least one precipitation test.

#### SUMMARY

1. A choice of method or methods for the serum diagnosis of syphilis is a problem of special interest to public health laboratories.

2. Of particular importance to all laboratories and especially those engaged in public health work without the advantage of skilful clinical checking of reactions is the question of the specificity of weakly and unexpectedly positive reactions.

3. What is particularly required is the use of a test or tests possessing only the maximum of sensitiveness consistent with specificity in order to earn the confidence of the medical profession in the significance of weakly positive reactions.

4. By employing a test or tests possessing the maximum of sensitiveness consistent with specificity, public health laboratories can do a great deal in minimizing the regrettable error of insufficient treatment of syphilis.

5. Precipitation tests for syphilis are more economical than the Wassermann test since a hemolytic system is not required but they demand an equal degree of skill and one more subject to error and interpretation of weakly positive and doubtful reactions.

6. Not infrequently the various precipitation tests for syphilis have been compared with complement-fixation tests lacking in acceptable sensitiveness and specificity and consequently resulting in erroneous conclusions.

7. Despite strenuous efforts none of the precipitation tests can be said to have displaced complement-fixation tests possessing an acceptable degree of sensitiveness and specificity when judged impartially and scientifically with adequate clinical control. The use of two or more precipitation procedures has not proved as satisfactory as complement-fixation and precipitation tests of acceptable sensitiveness and specificity for the routine testing of sera.



8. It is impossible at present to make a choice of a single precipitation test from among the large number available.

9. The new Meinicke or "clarification" test has been found more sensitive than the Kahn test, of equal specificity and easier to read and interpret the reactions.

10. In a comparative study of the Kline microscopic and Kahn precipitation tests and the Kolmer modification of the Wassermann test, the reactions agreed in 86.7 per cent of over 1,000 sera and disagreed in 13.3 per cent.

11. In general terms the Kline microscope test was more sensitive than the Kahn and Kolmer tests but likewise gave a higher percentage of nonspecific or falsely positive reactions than the Kahn test while the Kolmer modification of the Wassermann test gave no falsely positive reactions.

12. At the present time the serum diagnosis of syphilis is best served by conducting a carefully chosen complement-fixation and precipitation test on each serum.

NOTE: Since the writing of this paper an excellent article by Dr. Lucy S. Heathman and Miss Margaret Higgenbotham on A Study of the Kolmer-Wassermann, Kahn and Kline Tests has appeared in the *American Journal of Syphilis*, 16:385, 1932. The authors concluded that the Kolmer and Kline tests appeared to be a more valuable combination than the Kolmer and Kahn, or the Kahn and Kline as tests for evidence of syphilitic infection. They also found that the Kolmer and Kline gave more positive reactions in congenital syphilis than did the Kahn test. These investigators likewise found that the Kline test, being more sensitive than the Kolmer and Kahn, also gave more positive reactions in cases considered to be non-syphilitic. If any public health laboratory adopts the principle that two tests should be carried out on the principle of employing one with a high degree of sensitiveness but less specificity and another with less sensitiveness but higher specificity, I agree with the authors that the Kline better serves the former and the Kolmer the latter purpose.

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## Courses on Maternal Hygiene in Italy

A DECREE of April 8, 1932, issued by the director of the National Bureau of Maternal and Child Welfare, provides for the establishment in all the universities of Italy of 1-month summer courses in prenatal and postnatal hygiene for the physicians assisting the directors of the various health centers and engaged in the teaching of hygiene to the mothers and children attending the centers. Similar courses are also to be established for those midwives who are employed by the health centers as health visitors in rural districts. These courses will be given under the supervision of the previously mentioned bureau.

Another decree orders that a special inspection of all infant asylums and receiving homes in Italy be made in May, 1932. A professor of pediatrics was appointed in each province to carry out the inspection. This special inspection is to be made in addition to the inspections that the National Bureau of Maternal and Child Welfare has been making at irregular intervals.

A circular was also issued by this bureau to its branches throughout the country prescribing the technic of air bathing, sea bathing, and sun bathing, giving a classification of cases for which the seashore, the mountains, or level country is advisable.—*Maternità ed Infanzia*, Rome, Apr., 1932.

# An Appraisal Form for Industrial Health Service\*

LEVERETT D. BRISTOL, M.D., DR.P.H., F.A.P.H.A.

*Health Director, American Telephone and Telegraph Company,  
New York, N. Y.*

WITH reference to the importance of health in industry, the late Thomas Edison, dean of American inventors and father of several world-wide industries, said:

Coming generations of inventors will do their pioneering in the field of health. Electric light, telephone, radio, talking picture, automobile, air-plane—these things we have. What we have not is control over our own lives and bodies comparable to our control over material things. . . . Sickness is pretty hard on the workman. . . . There is too much sickness. . . . Something will have to be done about it.

It is significant that many industrial organizations have set themselves to the task of doing something about health promotion and disease prevention among employees. Some companies, fully realizing the direct relation between health and efficiency of workers, already are engaged in many of the activities which might be suggested in an Appraisal Form, while others have yet to develop a well rounded health program; for the former an appraisal will be the means of satisfactory audit; for the latter, it will lay the groundwork for a more complete program in the future.

One industrial group already has gone on record as favoring the adoption of some means of rating the health activities of comparable units of its company as a most effective means of creating and sustaining interest, and suggests the formulation of a plan which would properly evaluate the constructive elements of a reasonable health program in industry. The writer has prepared an initial Health Appraisal Form which is an attempt to take the first steps in the development of such a plan. It is conceivable that it might be broadened to include all personnel and industrial relations activities if subsequently desirable, or abbreviated to cover only such activities as those of medical departments. A suggested outline of an Appraisal

\* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-first Annual Meeting in Washington, D. C., October 26, 1932.  
Complete, detailed Form filed with the Chairman of the Committee on Administrative Practice, A.P.H.A.

Form for Personnel and Industrial Relations Service in general is given as an Appendix of the Form together with a Health Appraisal Form for smaller companies.

The Industrial Health Appraisal Form has been developed on the assumption that prevention and health protection, rather than curative medical treatment of accidents and industrial diseases, should dominate an industrial health service. In other words, industrial hygiene should include vastly more than emergency medical attention to specific occupational diseases, poisonings and accidents.

An Appraisal Form for Industrial Health Service does not mean to imply that all the suggested practices covered therein necessarily are desirable or feasible at this time in all organizations. The questions cover most of those things which might be included in a complete program for the larger companies. It is for the future to determine what should and can be done to meet local conditions and needs, especially of the smaller business concerns. This latter may be worked out best through local coördinating and assisting community agencies, such as state or local health or labor departments or associations.

#### THE NEED FOR MEASUREMENT OF INDUSTRIAL HEALTH SERVICE

The most important requirement at the present time for the further development and administration of industrial health programs is a plan or method for the measurement or appraisal of health activities. Such a plan would serve not only to evaluate but actually to promote industrial health services. While some industrial organizations have well organized health programs, much remains to be done by other companies in the development of a complete program.

There are so many factors entering into the problem of sickness, some of which are intangible and not, as yet, even remotely controllable, that it is difficult (if not impossible and wholly unfair) to judge the results of health administration or supervision, particularly in the industrial field, in terms of sickness rates alone or the amount of lost time due to sickness. The methods used in measuring the results of first aid and safety work are not well adapted to the appraisal of a health program.

In a positive health conservation program it is *performance or effort* in the development and administration of health activities (which taken as a whole eventually will result in reduced sickness) that should count, rather than the immediate decrease of sickness and time lost from work. The measurement of health work carried

on by an industry or by a particular area, division, district, or department in a company, should take into account the degree to which the company, or any unit of the company, has taken the necessary steps to protect and advance the health of employees.

The measurement of an industrial health program from the viewpoint of *total performance or company effort* presupposes and suggests the development of a so-called "Appraisal Form," "Rating Schedule," or "Record Booklet." The National Board of Fire Underwriters has developed such a form to assist cities in rating their fire protection services, and the American Public Health Association, American Child Health Association, and other public and community agencies have prepared forms to be used by states, cities, and counties in appraising their public health services. There is no apparent reason why such a practice and form should not be attempted by private and semi-public *industrial* organizations and their various departments and geographic divisions.

In the development of our preliminary and tentative form for industrial health appraisal, free use has been made of the experience, suggestions and published material of the above mentioned agencies, particularly of the National Board of Fire Underwriters and of the American Public Health Association, to which acknowledgment is made. Some of the major activities, standards, criteria and values in this industrial form have been set down tentatively and rather arbitrarily on the basis of those developed for the appraisal of city health work and of rural health work by the Committee on Administrative Practice of the American Public Health Association, on the assumption that industrial groups are nothing more than special working units of a community; and that industrial organizations, so far as possible, should fulfil their own share of obligations and responsibilities for community health and welfare.

#### A. OBJECTIVES

The objectives sought in the development of an Appraisal Form for Industrial Health Service are:

1. To obtain a picture of the extent or degree of organization and development of modern industrial health practice in a company or any unit of the same.
2. To serve as an instrument to promote, guide, interpret and measure health work in an industry or any of its units.
3. To arouse interest on the part of all company officials in the need for adequate health service in the industry; and to present those more directly in charge of the management of any unit with a tangible and concrete form of objective.

4. To provide stimulus for the development of a well balanced industrial health program, and to supply standard indices by which progress in health work may be followed by company personnel.

The purpose of such a measuring device at the moment is not to determine the quality or ultimate effectiveness of industrial health activities, but rather to show the extent and quantity of such work and to serve as an objective measurement to be used by personnel representatives, health supervisors, and other officials of business concerns in the inspection, appraisal or scoring of their own health activities, and the comparison and checking of the same from year to year. Indirectly, quality of work also would be measured to a considerable degree.

While such a rating schedule as suggested may be used in fostering the competitive spirit in health matters between various comparable units in a company, the chief use of such an Appraisal Form in the immediate future would be as a basis for comparison between what is and what should be in any given company or unit.

#### B. STANDARDS

It should be fully understood that the various criteria, standards and values used must be revised from time to time as conditions and practices change; but such changes should not be too rapid nor radical; otherwise it will become difficult to compare progress from year to year.

In general, the standards adopted for this Appraisal Form are far from being ideal, but have been set as high as practicable. The Form is in the nature of a scoring booklet and contains numerical values assigned to various activities in the industrial health promotion field. The rating for each activity is based partly on the health promotional value of each item in question, but more especially on the need for further development in industry of the particular activities noted.

#### C. CONTENTS OF FORM

The Form consists of various sections and subdivisions with their assigned values, as shown in Table I.

In the Form itself, not possible in this condensed paper, each of the subdivisions is further divided into various items or criteria which measure the amount of performance or frequency of practice, both of which are adapted to rather strict, impersonal quantitative measurement and can be assigned a definite quantitative number and value. To a lesser extent some of the activities are standard procedures

TABLE I

SECTIONS, SUBDIVISIONS AND ASSIGNED VALUES OF PROPOSED HEALTH APPRAISAL FORM  
FOR LARGE INDUSTRIES\*

<i>Sections and Subdivisions</i>	<i>Assigned Values</i>
A. Vital Statistics Activities .....	75
1. Death Records .....	2
2. Tabulation of Death Statistics.....	2
3. Sickness and Accident Records.....	7
4. Tabulation of Sickness and Accident Statistics .....	9
5. Interpretation and Use of Statistics .....	55
B. Communicable Disease Control .....	150
6. Records and Case Investigation .....	15
7. Immunization .....	50
8. Special Preventive Measures .....	70
9. Public Relations .....	15
C. Tuberculosis Control .....	100
10. Case Finding .....	17
11. Medical Service .....	25
12. Field Visiting .....	23
13. Institutional Care .....	35
D. Occupational Disease and Accident Control .....	200
14. Records, Case Investigations and Reports .....	30
15. Medical Examinations .....	50
16. Employees Brought to Professional Attention .....	30
17. Laws and Regulations .....	20
18. Inspection .....	40
19. Education .....	30
E. Personal and Environmental Hygiene of Office, Shop (Store), Factory and Outdoor Field Workers .....	400
20. Daily Inspection .....	10
21. Periodic Inspection .....	10
22. Field Visits .....	25
23. Medical Examinations .....	100
24. Employees Brought to Professional Attention .....	50
25. Sanitation of Headquarters, Branch Office Buildings, Shops (Stores), Factories and Outdoor Working Environment .....	100
26. Food and Milk Control .....	25
27. Health and Safety Education .....	60
28. Recreation and Rest Periods .....	20
F. General Health Publicity .....	75
29. Articles in Company Magazines .....	35
30. Health Bulletins and Reports .....	15
31. Health Posters and Movies .....	20
32. Special Health Publicity Activities .....	5
Maximum Total Score .....	1,000

\* See complete, detailed Form for scoring purposes. The author has a limited number of the complete Forms for distribution.

which cannot be scored down; they either are or are not routinely performed and can have only a fixed number and value and given a full score or nothing. To arrive at a total score for a company, or any unit being appraised, the major section totals are added after

each one of the sub-items has been determined and added. At the end of the Form has been included an "Appraisal Summary" item by item, covering section and grand totals to be used for final scoring. More detailed instructions will be found in the Form itself under "General Directions for Use of the Industrial Health Appraisal Form."

As Appendices there are included a proposed brief Form for the use of smaller industries or business concerns, its contents being outlined in Table II; and a suggested Form for Personnel and Industrial Relations Service in general, outlined in Table III of this paper.

### SURVEY QUESTIONNAIRE

Combined with the Appraisal Form is a suitable schedule or questionnaire for obtaining in proper sequence the fundamental data necessary and required for an intelligent appraisal of company health work. Thus the left-hand pages of the Form are given over to the so-called "Survey" containing questions and precise information in order that definite scoring can be made. On the right-hand pages

TABLE II

SECTIONS, SUBDIVISIONS AND ASSIGNED VALUES OF PROPOSED HEALTH APPRAISAL FORM  
FOR SMALLER INDUSTRIES AND BUSINESS CONCERNS\*

<i>Sections and Subdivisions</i>	<i>Assigned Values</i>
A. Death, Sickness and Accident Records .....	15
1. Records Kept .....	5
2. Records Used .....	10
B. Sickness and Accident Prevention Measures .....	30
3. Investigation of Cases .....	7
4. Sanitary Inspections .....	7
5. Sanitary Supervision .....	6
6. Specific Immunizations .....	3
7. Safety Devices .....	5
8. Examinations After Sickness .....	2
C. Personal Health Promotion .....	40
9. Physical Examinations .....	10
10. Periodic Examinations .....	5
11. Correction of Defects .....	2
12. Health Supervision .....	3
13. Supervision of Occupational Injuries .....	5
14. Medical Attention .....	5
15. Health Education .....	10
D. Public Relations .....	15
16. Compliance with Board of Health Regulations .....	5
17. Compliance with Federal and State Laws .....	10
Maximum Total Score .....	100

\* See complete, detailed Form for scoring purposes. The author has a limited number of the complete Forms for distribution.

the "Appraisal Form" itself is given, opposite the corresponding items in the "Survey Schedule," showing the standard values for the various items and containing columns for putting down the assigned scores. If it is desired not to use the right-hand page appraisal sheets, the left-hand pages may serve at least as an outline of a well rounded program.

#### D. COLLECTION OF DATA

It is assumed that it probably will take considerable time for Personnel Representatives or other officials of industrial companies to fill out the suggested Form, at least for the first time. Much of the information called for may never have been brought together under one head, by one department or person. Reference to and assistance from various departments and officials in a company may be required before the data can be assembled completely. When once the information and material have been brought together in concise form, and the "machinery" set up for gathering similar data from year to year, the task of periodic appraisal of company health activities and facilities should be fairly brief and simple.

#### PRELIMINARY TRIALS AND OPINIONS OF FORM

This survey and appraisal form has been used by one state-wide industrial organization, of about 4,000 employees, on a preliminary trial basis, and the vice-president in charge of personnel and public relations of this company makes the following comment:

I like the plan immensely. It advances our health program and medical supervision very materially. In giving us a chart to guide this activity, we can plan our work with confidence and definiteness, confining our major effort into administration.

The personnel officer of another company employing about 10,000 men and women scattered over several states, says:

I hope it will not be long before such a Form is officially adopted and published, because I feel there is a real need for it and that it will be most helpful in crystallizing management's views of the relative importance of various health activities. Also, it will be helpful to those of us who are undertaking to initiate and direct such activities, in measuring and comparing results by departments or areas.

#### PUBLICATION OF TENTATIVE FORM

Based on his past experience as a county health officer, and as a state health officer, as well as his active participation in city health administration, the writer is thoroughly convinced of the value of the



TABLE III

SECTIONS, SUBDIVISIONS AND ASSIGNED VALUES OF PROPOSED APPRAISAL FORM FOR  
PERSONNEL AND INDUSTRIAL RELATIONS SERVICE IN GENERAL\*

<i>Sections and Subdivisions</i>	<i>Assigned Values</i>
A. Employment Activities .....	1,000
1. Routine Records and Statistics .....	150
2. Selection of Employees .....	350
3. Employee Introduction and Supervision .....	250
4. Special Studies and Research .....	250
B. Educational Activities .....	1,000
5. Company Training Courses or Conferences .....	400
6. Outside School Relations .....	200
7. Information and Publicity .....	300
8. Special Activities .....	100
C. Economic Activities .....	1,000
9. Provisions Against Risk .....	600
10. Thrift .....	300
11. Personal Services .....	100
D. Health and Safety Activities .....	1,000
(See "An Appraisal Form for Industrial Health Service")	
E. Coöperative Activities .....	1,000
12. Employee Activities .....	250
13. Management Activities .....	150
14. Management and Employee Relations .....	400
15. Company and Public Relations .....	200
Maximum Total Score .....	5,000

\* See complete, detailed Form for scoring purposes. The author has a limited number of the complete Forms for distribution.

appraisal method not only in such public units as states, cities and counties, but also in semi-public and private industrial units; and he desires at this time to present this Appraisal Form in its preliminary and tentative state of development to the American Public Health Association with the suggestions: (1) that it be referred to the Committee on Administrative Practice, and with the tentative approval of the committee that it be published as a preliminary draft, for study and experimental use; and (2) that a new sub-committee on the Appraisal of Industrial Health Service of the Committee on Administrative Practice be appointed to follow and study the experimental use of the Form and possibly later, with the advice of other available experts in the field, to revise, standardize and adopt this or some similar Form. In view of the fact that such a Form would be particularly adapted to the use of large industries, an abbreviated Form, as outlined in Table II, also has been prepared for the experimental use of smaller companies and business concerns and might well be included as an appendix of the larger Form when published.

## CONSULTING AND ADVISORY SERVICES FOR SURVEYS AND APPRAISALS

The suggestion also is made that if and when such a Form is available, the American Public Health Association might supply to large and small industries, on request, a consulting and advisory service on the Appraisal of Industrial Health Service, as has been done for the appraisal of health service in such public units as cities and counties. Such a consulting and advisory service ultimately might pay for itself through the stimulation of industrial group memberships in the American Public Health Association, which could offer and be made to cover these technical advisory services on industrial health appraisal.

## COÖPERATION OF OTHER ASSOCIATIONS

Finally, in so far as the standardization and adoption of an Industrial Health Appraisal Form (with its special emphasis on sickness and accident prevention and health promotion) involve the technic of medical and surgical examination or treatment, it would be desirable for the American Public Health Association to seek the assistance and advice, if not the active coöperation and participation, of representatives of the American Medical Association, American Surgical Association and the Association of Industrial Physicians and Surgeons. Moreover, the coöperation of some such organization as the American Management Association, which includes representatives of the leading business concerns of the country, might be obtained to foster the Health Appraisal idea among industries just as the Chamber of Commerce of the United States has stimulated the Appraisal of Health Administration in American municipalities.

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Sir Henry Acland

“ANY system of medicine which should ignore duty to the masses as well as to the individual is now no medicine at all; yet some here can recall the day when the prevention of disease was considered almost outside the province of an orthodox medical man.”—Sir Henry Acland, President, General Medical Council, 1887. Quoted by Sir George Newman, *Brit. M. J.*, July 30, 1932.

## EDITORIAL SECTION

*Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.*

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## THE SIXTY-FIRST ANNUAL MEETING

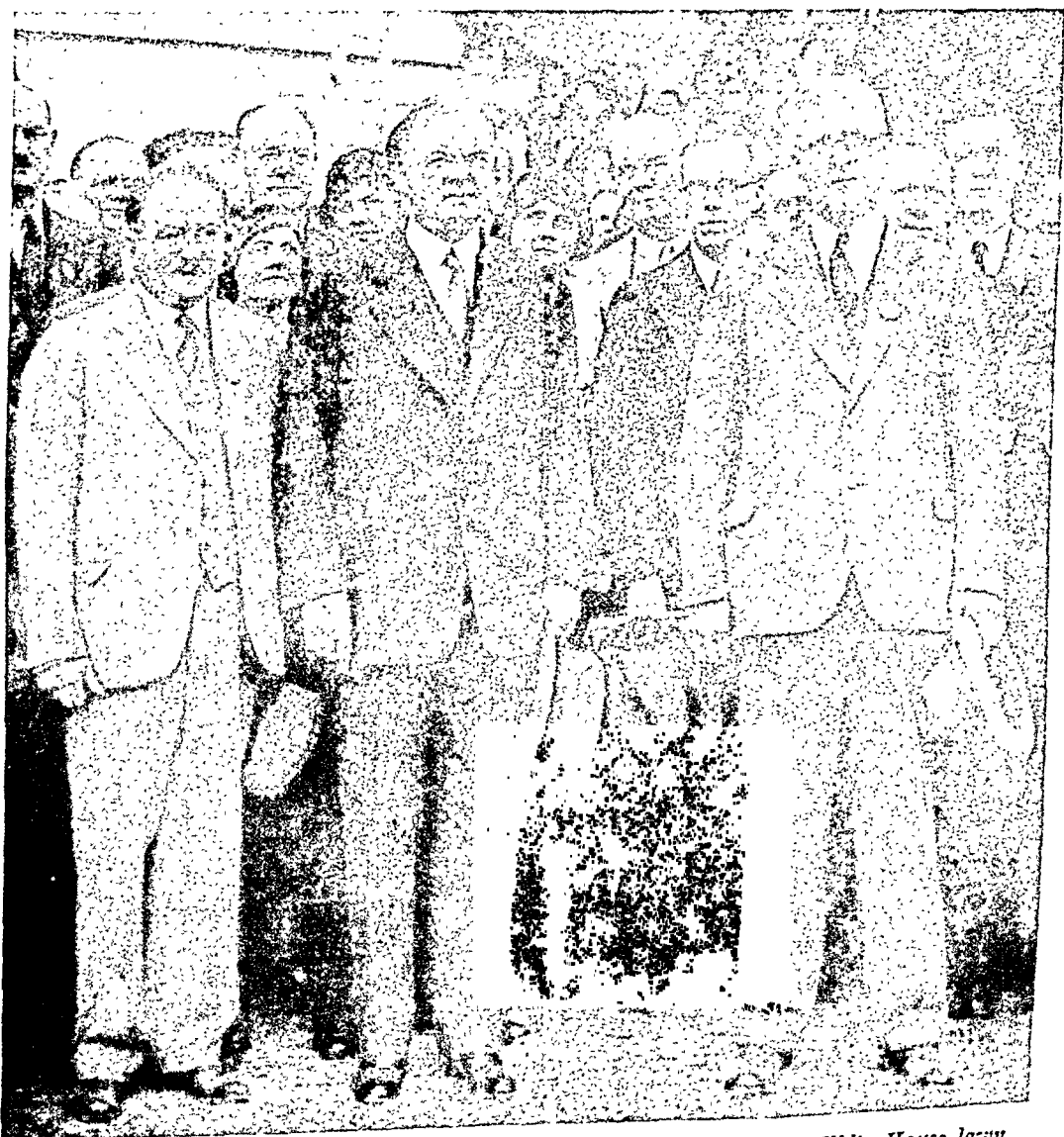
THE 61st Annual Meeting of the American Public Health Association has passed into history, but carries with it many pleasant memories for all of those who attended. The number of registered delegates was 1,233. Many people who attended only one or two sessions did not record their presence. Estimating their number on the basis of past experience, and including those actually registered, upwards of 1,600 were in attendance. It is interesting to direct attention to a statement by the convention manager of one of the large Washington hotels. He said the A.P.H.A. meeting was the only convention held in Washington in 18 months the attendance at which realized and exceeded the expectations. Other gatherings have been from thirty-five to fifty per cent below the estimate. The forecast for our meeting was 800 to 1,000, and the final figures are surprising and gratifying, particularly in view of the fact that travel expenditures in health department budgets have been so drastically cut. Many members of the Association travelled to the Annual Meeting at their own expense.

The Committee on Meetings and Publications struck two new notes—first, upwards of 100 new names were included as giving papers in our program, and second, a summary of work from the 10 different Sections was given in the Public Health Ten Star Final. We believe that including new names should add to our membership and increase the interest of old members, although we have on our program always

a number of tried and true stand-bys, particularly on our various committees, who give us the substance of what has been done in their various branches during the year which has elapsed since our last meeting.

The Laboratory Section had by far the greatest number of papers, so much so that it will be impossible for us to give all of them to our readers in the pages of the JOURNAL. Almost every subject of interest to laboratory workers was considered.

At the first General Session, which was largely attended, President Hoover gave a short address. Following this, the President of the Association summed up the situation in the country as regards health, and also the condition of the Association itself. It was an encouraging summary, showing that in spite of the depression, the health of the



*Dr. Dublin, President Hoover, and Dr. Ferrell at the reception on the White House lawn*

country has never been better, but he uttered a very sound warning against being too optimistic, since there is no doubt in the minds of practically all health workers that the effects of the depression, both physical and mental, will show themselves sooner or later.

The Association itself is in a healthy condition. The number of Life Members has been doubled during the year and losses have been made up, so that the membership roll is now at its peak. However, the budget has been hit and all salaries have been reduced. The President paid a deserved tribute to the workers on the cheerful way in which they have accepted the situation, including the pay cuts, and continued their work with the highest degree of enthusiasm and efficiency. There has been no let-down in the morale.

At the Montreal meeting in 1931, it was considered possible to enlarge the JOURNAL by 20 pages a month, which would have taken a tremendous burden off the shoulders of the Committee on Meetings and Publications, and especially the editors. However, instead of the increase, we have during the year lost 64 pages, which has made it necessary to return even papers already prepared for the printer, and for which prompt publication was confidently expected.

We have already said that the program was excellent in all respects and it may seem invidious to pick from it certain sections which seemed to attract especial attention. The first General Session was followed by a reception which was largely attended. On Wednesday morning, a symposium on milks and their especial antirachitic value, their development and use, attracted much attention, not only on account of the recognition of the importance of foods in general and milk in particular, and their discussion in journals, scientific as well as lay, but also on account of the high standing of those who took part. At 12:30 those who desired to do so went to the White House lawn where Mr. Hoover received them and a photograph of the group was made. At 1 o'clock, a special luncheon session on diphtheria prevention was held, which also claimed a very large attendance. At 2:30 one of the new features, the Ten Star Final, was held in the large ballroom. In spite of the fact that 800 chairs had been provided, there were many standing. It was the opinion of those who attended that under one name or another such a summary of the activities of the Association, and of the condition of the sciences dealt with by our 10 sections, should be a feature of future meetings.

Washington was at its loveliest. The local committee had done everything possible for the comfort and enjoyment of the guests. Excursions were provided, free of expense, to the National Institute

of Health, the Surgeon General's Library, Walter Reed Hospital, Sewage Disposal Plant, and many other places of interest. Altogether, the meeting at Washington may be put down as a success which will long be remembered by members of the Association.

## RAW VS. HEATED MILK

STRANGE as it may seem to those of us who have studied the pasteurization question and who believe in it, there is still agitation in favor of raw milk and allegations are made that the heating of milk destroys to a certain extent its nutritive value. There is also an association in the United States devoted to pushing the use of raw milk. Some of its agents are making the claim that pasteurization is injurious.

The report in 1931 from the National Institute for Research in Dairying<sup>1,2</sup> was quite disconcerting, as it apparently showed that, as far as rats were concerned, milk pasteurized at 145–150° F. for ½ hour and milk heated to 210–212° F. for ½ hour gave evidence of a lack of certain nutritive factors as evidenced by reproduction. Animals fed on raw and pasteurized milk, plus biscuit made of white flour and water, grow and reproduce normally, while in those fed on sterilized milk, plus the biscuit, reproduction failed, and of the original rats, many failed to reach maturity. As far as this part of the experiment goes, it demonstrates only injury to the vitamin concerned in reproduction, but the report further states that there were visible differences in the rats even in the first generation, always in favor of raw and to the great disadvantage of sterilized milk. The difference between the effects of pasteurized and sterilized milk in these experiments must be noted, in spite of the general conclusions reached, that heating injured the nutritive value of milk. During 5 years of study, the authors state while animals thrived on milk for a considerable time, never before have they been able to continue feeding beyond the fourth generation on an almost exclusively milk diet.

In view of this situation, the report from the U. S. Public Health Service of a group of workers headed by Leslie C. Frank<sup>3</sup> is reassuring, and of great value in the campaign which is going on everywhere for the pasteurization of market milk. Studies on children fed raw and heated milk plus the supplementary diet received by the average American child between 10 months and 6 years of age have been carried on in 39 cities situated in 10 states. The number of children covered was 3,700, and the general conclusion reached was:

The growth-promoting capacity of heated milk plus the supplementary diet received by the average American child of 10 months to 6 years is not measurably less than the growth-promoting capacity of raw milk plus the supplementary diet received by the average American child of 10 months to 6 years.

Further analysis of the general results shows that there were 32 cases of diphtheria among 1,875 children who received heated milk only against 40 among the 1,762 children fed predominantly on raw milk, case rates of 17.1 and 22.7 per 1,000, respectively. For scarlet fever, the group fed on heated milk showed 43 cases against 73 for the raw milk group, case rates of 23.0 and 41.4 per 1,000, respectively.

Intestinal disturbances reported under such names as diarrhea, dysentery, flux, colitis, and summer complaint, amounted to 426 for the group fed on heated milk against 491 for those fed on raw milk, case rates of 227.0 and 278.0 per 1,000, respectively. Excluding diarrhea, which the authors of the report believe includes many mild cases not caused by milk, the cases of intestinal diseases amount to 208 for those fed on heated milk and 395 for those fed on raw milk, case rates of 111.0 and 196.0 per 1,000. For those fed on heated milk there were 59 cases of rickets against 90 in the raw milk group, case rates of 31.5 and 51.1 per 1,000, respectively. It was found that among those fed on heated milk predominantly, more were given cod liver oil.

The average weight of the children in the two groups differed insignificantly, being 33.6 for the heated milk group and 33.2 for the raw. The same statement applies to average height, being respectively 37.5 and 37.4 inches. The supplementary diet of the 2 groups was very much the same, except for cod liver oil which was given during an average of 41.6 per cent of the lives of children fed heated milk, and only 27.6 per cent of the lives of those fed raw milk. The average weight of 636 children fed on heated milk who received no cod liver oil was 33.5 pounds as compared with 33.8 pounds for 794 children of the same group who received cod liver oil during more than half of their lives, indicating that the percentage of life during which cod liver oil was fed did not affect the relative position of the 2 age-weight curves to any extent. It is apparent also that the children who were fed raw milk predominantly had a higher incidence of diphtheria, scarlet fever, intestinal disturbances, and rickets than those receiving heated milk only.

This report does not consider tuberculosis, but we have evidence from New York City particularly, where 98 per cent of the milk is pasteurized, that the incidence of bovine tuberculosis in children has dropped enormously. This decrease in tuberculosis of human origin

among infants is noted also. In view of these facts, taken with those now presented, the advocates of pasteurization can go ahead with a clear conscience in their work, feeling assured that they are not in any way injuring the health prospects of children, but are, on the other hand, protecting them against tuberculosis, intestinal disorders, and all other diseases which are transmitted through milk.

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2. *Annual Report*. National Institute for Research in Dairying, University of Reading, England.
3. Frank, Leslie C., et al. Do children who drink raw milk thrive better than children who drink heated milk? *Pub. Health Rep.*, Sept. 23, 1932.

### IS THE REGISTERED INCREASE OF HEART DISEASE REAL OR APPARENT?

AN interesting and timely paper<sup>1</sup> discusses the alleged "appalling increase" in heart disease. The writers acknowledge that the number of deaths charged to the cardio-arterio-renal system is enormous and constitutes one of the new and important health problems. This opinion will be accepted by all who have studied the question. They point out, however, that in spite of this alleged rapid increase, they know of no extensive or well planned study to determine its causes or to establish control measures. In place of this, there is a good deal of talk about the pace of modern living and other similar phrases which mean little or nothing. As they express it, there is a wealth of opinion but little real scientific evidence. Their own study is devoted entirely to the mortality statistics of New York City. They have analyzed the basic data as given in the death certificates and have pointed out the sources of errors. They point out also—what is well known to all pathologists—that the pathological changes and etiological factors of heart disease are not to be limited to the heart itself, but include also the arteries and kidneys, from which fact the term cardio-arterio-renal system has evolved.

In New York City, the registered increase in heart disease is admitted, but there is shown to be a fairly corresponding decrease in apoplexy, Bright's disease, and deaths from senility. The authors hold that the registered rise in death rate from heart disease is largely, if not wholly, fictitious, and that statistics based on these alone are fallacious, since those assigned to apoplexy, arterial and kidney diseases, and senility must be taken into account. They point out further that for the registration area of the country as well as for New York City, the specific death rates, even in the higher age group, have declined since the beginning of this century, a fact which they find it



hard to reconcile with any considerable increase in the mortality from heart disease.

There seems to be little doubt that the group of diseases classified under cardio-arterio-renal, which often goes under the name of heart disease, is more common now than it was 30 years ago. It is possible that there are changes in the incidence independent of the increased age level of the population, but so far, no one has been able to prove this. Some pathologists hold, apparently justly, that the increase is in part real, giving as possible factors which may be concerned as items under etiology—sex, age, occupation, habits, previous disease, acute or chronic infections, especially of the lungs such as those following influenza, which affected such a large population of the country during the epidemic of that disease which occurred from 1918 to 1923. Further than this, there is a possibility that the inheritance of a poor cardio-arterio-renal system may play some part, but there is no ground for considering this too seriously.

Of real significance must be considered the alcoholic beverages which are now taken. These have long been assigned as a cause of heart-blood-vessel-kidney disease. If it is a fact that alcohol does play such a part in this group of diseases here in America since prohibition came in, we have gone the limit in the use of hootch and other raw alcoholic beverages into which poisonous products, due to rapid distillation, imperfect fermentation, etc., may have passed.

The paper is worthy of the consideration of all interested in preventive medicine and it is to be hoped that the pathologists and the statisticians of the country will join hands in an effort to determine the truth and to propose remedies which may be put into effect by our health authorities.

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1. Bolduan, Charles F., and Bolduan, Nils W. Is the "appalling increase" in heart disease real? *J. Prev. Med.*, 6:4 (July), 1932.

#### SIR RONALD ROSS

SIR Ronald Ross died on September 16 at his home in Putney, England, at the age of 75 years. He is one of the men who has written his name indelibly in medical annals, owing to his discovery that the *Anopheles* mosquito carries malaria, and of the method by which this is accomplished. Unfortunately, a bitter controversy arose over the credit for this, which we believe belongs practically entirely to Sir Ronald Ross. Those in charge of the awarding of the Nobel Prize in Medicine certainly had the same opinion, as this prize was given to him in 1902 on account of his discovery. The clinching

argument has always been a poem which he wrote on the day his discovery was made: "I know this little thing a myriad men will save." This shows that he realized not only that he had made a discovery, but also what it meant to the world. He had the good fortune to live long enough to see his ideas put into effect and to see malaria brought under control in many parts of the world. There is little question that if malaria was as deadly a disease as yellow fever, the control of it would be more perfect, since abundant funds would be available for the work.

Sir Ronald Ross was born at Almora, India, the son of General Sir Campbell Claye Grant Ross. He obtained his medical education in England and entered the Indian Medical Service in 1881. There is little question that he owed his inspiration to follow the line of work in which he made this great discovery to Sir Patrick Manson. Laveran had discovered the germ of malaria and had even forecast the mosquito conveyance, but did not prove it. Sir Ronald overcame what would have been insuperable difficulties to others. The authorities interrupted his work several times and did not seem to see the value of it, though at the time there were more than a million deaths every year from malaria in India. During the World War he lost his son in one of the early drives. He served as consultant in malaria to the War Office, and later held a similar position in the Ministry of Pensions.

Many honors were paid him and degrees given to him, but pecuniary assistance did not follow to any great extent. He was the founder of the Ross Institute and Hospital for Tropical Diseases, but toward the end of his life was very hard put to it for a living.

He has been described as a "many sided genius." In addition to his scientific work he wrote poetry, novels, and five mathematical works, which his latest biographer, R. L. Megroz, feels have not received sufficient recognition. He had many friends in America.

Few men have made discoveries of more value to the human race, and his name will always be honored by all public health workers as well as all members of the medical profession.

## ASSOCIATION NEWS

### DR. JOHN A. FERRELL, PRESIDENT A.P.H.A.



*John A. Ferrell, M.D.  
President, A.P.H.A.*

**D**URING the past year the office of President of the Association has been filled ably and acceptably by Louis I. Dublin, Ph.D. The year has been a trying one and he has successfully met problems more difficult than most presidents have to face. We will still have his wise counsel as a member of the Executive Board. We are fortunate in his successor, John A. Ferrell, M.D., Director of the International Health Board of the Rockefeller Foundation, who has served in the capacity of President-Elect of the American Public Health Association since the last Annual Meeting in Montreal. His work is well known to sanitarians from the time he joined the Rockefeller Sanitary Commission in 1910. He was first in charge of the Commission's Work in North Carolina directing an educational campaign against hookworm. When the Rockefeller Sanitary Commission became the International Health Board with a world-wide program, Dr. Ferrell was made Director for the United States.

### DR. HAVEN EMERSON, PRESIDENT-ELECT A.P.H.A.

**H**AVEN Emerson, M.D., of New York, President-Elect of the American Public Health Association, received his A.B. degree from Harvard and his medical education from the College of Physicians and Surgeons of Columbia University, graduating in 1899. After 2 years of internship at Bellevue Hospital he entered general practice of medicine in which he con-

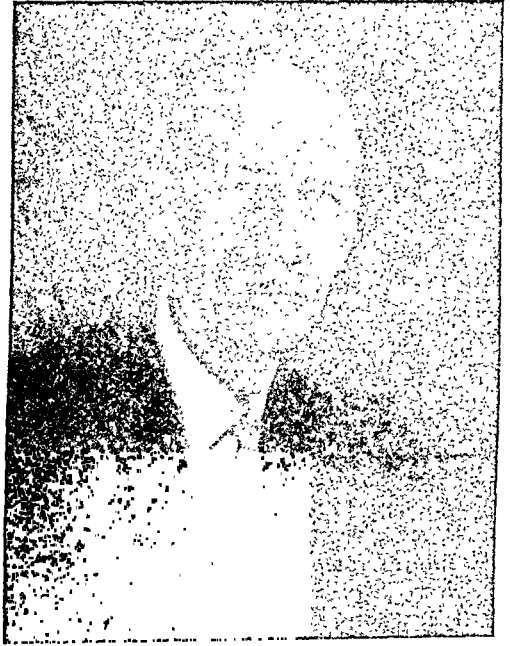
tinued for 15 years, during which he was successively demonstrator and associate in Physiology and associate in Physical Diagnosis at the College of Physicians and Surgeons.

In 1914 he was appointed Sanitary Superintendent and Deputy Commissioner of Health to New York City. In 1915 he succeeded Dr. Goldwater as Commissioner of Health. From Janu-

ary, 1918, to June, 1919, as Major, Lieutenant-Colonel, and Colonel in the Medical Corps of the Army, Dr. Emerson held the position of Epidemiologist of the American Expeditionary Forces in France. During 1920 and 1921 he served as Professor of Preventive Medicine and Hygiene at Cornell University, Ithaca, N. Y., and during that time, directed the Cleveland Health and Hospital Survey. In 1921-1922, he was the Medical Adviser of the Veterans' Bureau. Since 1922, Dr. Emerson has been Professor of Public Health Practice and Executive Officer of the DeLamar Institute of Public Health at the College of Physicians and Surgeons of Columbia University. He has carried out directly, or in collaboration with others, a number of health and hospital surveys of American cities, and the survey of the health and medical facilities of the city of Athens, Greece, for the Health Section of the League of Nations.

Dr. Emerson received the Médaille d'Epidémie en vermeille, was decorated as Chevalier of the Legion of Honor by

the Republic of France, and received the Distinguished Service Medal from



*Haven Emerson, M.D.  
President-Elect, A.P.H.A.*

the United States Government. He is a member of the National Advisory Health Council of the National Institute of Health.

## NEW MEMBERS

*The following list includes applicants who have been approved for membership in the A.P.H.A. by the Sub-Committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.*

### *Health Officers Section*

George W. Bushong, M.D., Tompkinsville, Ky., Director, Monroe County Health Department  
John F. Cadden, M.D., Calhoun, Ky., Health Officer, McLean County  
Dr. F. W. Caudill, Georgetown, Ky., Director, Scott County Health Department  
Taylor Center, M.D., Campton, Ky., Health Officer  
Lewis C. Coleman, M.D., 2904 Reisterstown Rd., Baltimore, Md., Madison County Health Officer  
Leonard A. Crosby, M.D., Williamsburg, Ky., Director, Whitley County Health Department  
Joseph W. Davis, M.D., 204 S. Wells St.,

Sistersville, W. Va., Director, Mobile Unit No. 2  
Rosier D. Dedwylder, M.D., Cleveland, Miss., Director, Bolivar County Health Department  
John W. Dukes, Hindman, Ky., Director, Department of Health  
E. E. Edwards, M.D., 422 S. Main St., Taylor, Pa., Health Officer  
G. W. Fishbaugh, M.D., Court House 303, Portsmouth, O., Health Commissioner  
Lynn M. Garner, M.D., Tuscumbia, Mo., Director, Miller County Health Department  
Marshall C. Guthrie, M.D., 15 E. Taylor St., Chevy Chase, Md., Medical Director, U. S. Public Health Service  
Thomas J. LaMotte, M.D., Box 314, Elkton, Ky., County Health Officer, Todd County

Hugh L. McCalip, M.D., Yazoo City, Miss.,  
Director, Yazoo County Health Department  
Thomas J. Pool, M.D., Ola, Ark., Field Agent,  
U. S. Public Health Service, Medical Director,  
Yell County Health Unit

Thomas N. V. Potts, M.D., D.P.H., Public  
Health Dept., County Hall, Wakefield,  
England, County Medical Officer and School  
Medical Officer (Assoc.)

Walter F. Stillger, M.D., Professional Bldg.,  
Hicksville, N. Y., Health Officer, Oyster  
Bay

Albert B. Tonkin, M.D., Riverton, Wyo.,  
President, State Board of Health

Milton W. Williamson, M.D., Greensburg, Ky.,  
Director, Green County Health Department

#### *Laboratory Section*

Winifred M. Ashby, Ph.D., 419 4th St. N.W.,  
Washington, D. C., Bacteriologist, St.  
Elizabeths Hospital

Lucius F. Badger, M.D., National Institute of  
Health, Washington, D. C., Commissioned  
Officer, U. S. Public Health Service

Henry A. Cotton, M.D., N. J. State Hospital,  
Trenton, N. J., Director of Laboratory  
Research in Mental Disorders

Walter LeRoy Mallmann, Ph.D., Department  
of Bacteriology, Michigan State College,  
East Lansing, Mich., Sanitary Bacteriologist

Herbert E. McDaniels, B.S., 6536 Emerald  
Ave., Chicago, Ill., Bacteriologist, State  
Department of Public Health

Mrs. Betty Morris, Hinton, W. Va., Clinical  
Laboratory Worker (private hospital)

John E. Noble, Rm. 200, District Bldg., Washington,  
D. C., Bacteriologist

Isadore Pilot, M.D., 185 N. Wabash Ave.,  
Chicago, Ill., Associate Professor of  
Pathology and Bacteriology, University of  
Illinois, College of Medicine

Anni Seppanen, M.D., Helsinki Eerikinkatu I,  
Finland, School Physician (Assoc.)

George W. Wheeler, M.D., 525 E. 68th St.,  
New York, N. Y., Assistant Professor of  
Applied Bacteriology, Cornell University  
Medical College

#### *Vital Statistics Section*

John H. Milligan, P. O. Box 87, West Falls  
Church, Va., Chief, Bureau of Vital Statistics,  
Health Department, Washington, D. C.

Hugo Muench, Jr., M.D., Dr.P.H., Rockefeller  
Foundation, New York, N. Y., Field  
Staff

Jessamine S. Whitney, A.B., 164-16 Cryder's  
Lane, Beechhurst, L. I., N. Y., Statistician,  
National Tuberculosis Association

#### *Public Health Engineering Section*

Harry S. Abell, C.E., P. O. Box 35, McLean,  
Va., Chief Sanitary Section, U. S. Veterans  
Admr., Washington, D. C.

Arthur W. P. Blohm, 2206 Walbrook Ave.,  
Baltimore, Md., Assistant Sanitary Engineer,  
State Department of Health

Paul F. Bovard, B.S., 964 Spruce St., Berkeley,  
Calif., Consulting Sanitary Engineer

Lewis V. Carpenter, Box 562, Morgantown,  
W. Va., Professor, Civil and Sanitary  
Engineering

Ross E. Garrett, B.S., 501 Carlson Bldg.,  
Pocatello, Idaho, City Public Health  
Engineer

William D. Hobro, 678 Fifth Ave., San  
Francisco, Calif., Chief Inspector of  
Plumbing

Edward O. Madison, Lebanon, Tenn., County  
Sanitary Officer

Charles E. Trowbridge, 50 Broad St., New  
York, N. Y., Sanitary Engineer, American  
Water Works and Electric Company

Arthur D. Weston, 15 Blackstone Terrace,  
Newton, Mass., Chief Engineer and Director  
Division of Sanitary Engineering, State  
Dept. of Public Health

#### *Industrial Hygiene Section*

Waldemar C. Dreessen, M.D., U. S. Public  
Health Service, Washington, D. C., Asst.  
Surgeon

James E. Ives, Ph.D., U. S. Public Health  
Service, Washington, D. C., Senior Physicist

Edward S. McSweeney, M.D., D.P.H., N. Y.  
Telephone Co., 140 West St., New York,  
N. Y., Medical Director

Louis Schwartz, M.D., U. S. Public Health  
Service, New York, N. Y., Studies of Industrial  
Dermatoses

#### *Food and Nutrition Section*

Reid R. Ashworth, D.V.S., 3533 Hertford Pl.  
N.W., Washington, D. C., Chief Food and  
Dairy Farm Inspector

Frederic H. Bartlett, M.D., 108 E. 79 St., New  
York, N. Y. (Assoc.)

Herbert B. Lerner, S.B., National Oil Products  
Co., Harrison, N. J. (Assoc.)

#### *Child Hygiene Section*

Dr. H. S. Berman, 10 Peterboro, Detroit,  
Mich., formerly with Infant Welfare Department,  
Detroit Department of Health

Henry A. Dirschedl, M.D., 613 W. Market  
St., Pottsville, Pa., Medical Inspector, Public  
Schools

L. M. Merrow, M.D., 720 Market St.,  
Mechanicsburg, Pa., formerly with State  
Health Department

Charlotte R. Rader, M.D., Laramie, Wyo.,  
Director of Health Work, Public Schools

Frances C. Rothert, M.D., U. S. Children's  
Bureau, Washington, D. C., Associate Medical Officer

Dr. Marion Stevenson, Houghton, Mich.,  
Ophthalmologist, Children's Fund of Michigan

Joseph S. Wall, M.D., 1864 Wyoming Ave.,  
Washington, D. C., former Director, Child Welfare Society

#### *Public Health Education Section*

Aurelia B. Cote, B.S., Seaford, Del., Director  
of Health Education, Public Schools

Nora S. Hamner, R.N., 1112 Capitol St.,  
Richmond, Va., Executive Secretary, Richmond Tuberculosis Association

H. Mac Hindman, R.N., Palo Alto Hospital,  
Palo Alto, Calif., Superintendent

Mrs. M. Pierson, B.S., 110 E. 14 St., Austin,  
Tex., Assistant Secretary and Treasurer, Texas Public Health Association

Charles M. Smith, M.D., Box 107, Dixon,  
Ky., Director, Webster County Health Department

Emma Stewart, B.A., 821 E. Washington St.,  
Ann Arbor, Mich. (Assoc.)

Philomena Supper, R.N., 100 Parsons St.,  
Detroit, Mich., Director, Department of Health Education, Marygrove College

#### *Public Health Nursing Section*

Marion H. Douglas, R.N., 55 Allyn St., Hartford, Conn., Executive Director, Visiting Nurse Association

Florence O. Eby, R.N., Betsy Barbour House,  
Ann Arbor, Mich., Student (Assoc.)

Mary B. Hulsizer, A.B., 31 Green St., Newark,  
N. J., Supervisor of School Nursing, Bd. of Education

M. Louise Nicol, 1228 Hamilton Blvd., Peoria,  
Ill., District Supervising Nurse, State Department of Health

Bertha McKay Ohr, 1707 Columbia Rd. N.W.,  
Washington, D. C., School Nurse

Katharine E. Peirce, R.N., 2203 Orleans St.,  
Baltimore, Md., Supervisor, Eastern Health District

Amanda M. Sheeler, R.N., 220 W. Main St.,  
Moorestown, N. J., Supervisor, Visiting Nurse Association

Elizabeth S. Soule, R.N., University of Washington, Seattle, Wash., Director, Department of Nursing Education

Willena Tracy, R.N., 104 Central Ave., Gladstone, Mich., City Nurse

#### *Epidemiology Section*

Charles Armstrong, M.D., 1001 Ohio St. N.E.,  
Washington, D. C., Surgeon, U. S. Public Health Service

Fred C. Bishopp, Ph.D., U. S. Bureau of Entomology, Washington, D. C., Medical and Veterinary Entomology

J. Davis Bradfield, 1010 Rhode Island Ave. N.E., Washington, D. C., Medical Inspector, Health Department

Stewart M. Grayson, M.D., 1833 New Hampshire Ave. N.W., Washington, D.C., Medical Inspector, Health Department

Claude H. W. Mitchell, D.P.H., Silver Spring National Bank Bldg., Silver Spring, Md. (Assoc.)

#### *Unaffiliated*

Joseph H. Kler, M.D., Rutgers University,  
New Brunswick, N. J., University Physician

Herbert C. Ober, M.D., DMD., 38 Eldridge St., Newton, Mass., Industrial Medicine, Hood Rubber Co. Inc.

#### APPLICANT FOR FELLOWSHIP

#### HEALTH OFFICERS' SECTION—

R. H. Markwith, M.D., Commissioner of Health, Summit County, Akron, O.

## TRAINING AND PERSONNEL

### REGISTRATION OF HEALTH OFFICERS AND ASSISTANT HEALTH OFFICERS

**I**N January, the Association will publish a Directory of Health Officers and Assistant Health Officers. This will be used in connection with the national movement to provide tenure of office for existing health officers and the appointment of experienced or trained health officers when new appointments are to be made.

If you are a health officer or assistant health officer, and have held such a position for 2 years or more and have not been out of the public health field for more than 2 years, your name should be on this list. Fill out and send to the Association the blank sent to you last spring, or if you have not received such a blank, write for one.

## LETTER FROM GREAT BRITAIN

A MEMORIAL TO THE LATE  
SIR ANDREW BALFOUR

THE ceremony of unveiling the memorial to the late Sir Andrew Balfour on October 6 was one of the most brilliant and largely attended that the London School of Hygiene and Tropical Medicine has seen. This was not surprising, for in the medical profession there are few who have had so many and such varied interests as Balfour, and none who has attained so high a place and earned so much of esteem and regard in each of his interests. From the fields of nearly all of his activities there were representatives met together to hear and express agreement with the glowing tribute paid to the memory of Sir Andrew by the Earl of Athlone, Chancellor of the University of London.

As explained by Sir Holburt Waring, of the Court of Governors, the suggestion that there should be a memorial to Andrew Balfour was very warmly welcomed by a very wide circle of his friends, and within the space of a comparatively few months a sum of over £2,000 (\$8,000-9,000) had been subscribed or promised. The greater part of this sum is to be devoted to the purpose of enabling students, preferably from overseas, to pursue courses of study in the School. The remainder was used to provide and erect a tablet to the memory of Sir Andrew Balfour in the entrance hall of the School. No one connected with that institution, for which London University is indebted to the Trustees of the Rockefeller Fund, is more deserving of such recognition as a tablet can offer than Andrew Balfour. It was the last piece of work to which he put his mind and that, as the Chancellor said, he "brought to fru-

ition, through 7 years of unremitting zeal, untiring energy, and an enthusiasm—nay, a passion—for the successful accomplishment of his task."

The very many friends he had in preventive medical and teaching circles in the United States of America will agree that there could be no description of Andrew Balfour from which the words zeal, energy, and enthusiasm could rightly be omitted. He was a tremendous worker, no matter where he was or what he did. Everywhere, and there was apparently no part of the globe where he did not work, and whatever the kind of it, all of it was inspired by zeal, energy and enthusiasm.

All of the greatness he attained—and I have thought often, knowing him intimately, that no one except Balfour himself, the most modest of men, was surprised at that greatness—came to him because of these three things. Also, and without doubt, they brought his life to his pathetic and untimely end at the early age of 58, for if it could be said of anyone at any time that he worked himself to death it could be said of Balfour. In the interests of the London School of Hygiene and Tropical Medicine and of the British Empire, if not, indeed, of the nations of the world, he worked and worried himself to death. With his passing there went out, as the Earl of Athlone described him, a man without guile, honest to the core, and one who evoked in his colleagues a spirit of love and sacrifice.

It is good that there should be in the hall of the School a permanent record of his devotion to the cause of tropical hygiene and of his self-sacrificing labors on behalf of the school. More appropriate still is it that, having regard to what he was and did, and for the encouragement of others also, there should

be upon the tablet these noble words of Walt Whitman: "Through the battle, through defeat, moving yet, and never stopping. Pioneers! O Pioneers!"

PROFESSOR CARL PRASNITZ AND THE  
TEACHING OF PREVENTIVE MEDICINE

**O**CTOBER with us always is a month of addresses, but never have I known one more replete with oratory than this one has been. The medical schools, which open in October, began it, each, in London at any rate, calling up someone more or less distinguished to tell the students just how wonderful a career they have chosen and to give a talk upon some subject he is particularly interested in. As the occasion is usually also that of the annual prize giving, and the students who have gained awards at any rate are bound to attend, the meeting is in general very pleasant and nice and in the main decorous.

Close on the heels of these school orations there have followed this October a multitude of others many of them upon preventive medical subjects and therefore of particular interest to members of the health service. Of outstanding importance have been the Heath-Clark Lectures of Professor Carl Prausnitz of Jena, and the Harveian Oration to the Royal College of Physicians of Sir George Newman, Chief Medical Officer of the Ministry of Health. As the first Heath-Clark lecturer—the course was only inaugurated last year—Sir George Newman took the chair at the first of Professor Prausnitz's lectures and presented him to the audience in the lecture theatre at the London School of Hygiene and Tropical Medicine. Not, as Sir George explained, that much in the way of introduction was necessary since, apart from the fact that he is known by his work, Carl Prausnitz attended school in England, studied for an English medical qualification in London, and held cer-

tain teaching and laboratory appointments before taking up work in Jena. As a result there was no language difficulty and when he addressed us it was as if we listened to one of our own university professors delivering a lecture. In his course Professor Prausnitz discussed "The Teaching of Preventive Medicine in Europe," and gave us the results not only of a very full investigation he had carried out in various schools in various countries but also of very serious consideration given to the whole subject. From the view submitted it was clear that considerable differences and divergencies exist, and that in every country some sort of attempt is being made to get the teaching placed on a sound and broad basis.

In this country, largely on the initiative of Sir George Newman, who some years ago issued a special report on the need for teaching preventive medicine in the medical schools and the methods that might be adopted, and more recently as a result of pressure brought to bear by the Society of Medical Officers of Health, the attention of the General Medical Council, the medical schools and examining bodies has been directed to the matter. The results that have followed the directing of this attention unfortunately leave much to be desired. The hope is nourished, however, that this visit of Professor Carl Prausnitz and the lectures he has delivered may have the effect of impressing upon the bodies mentioned, and more especially the teaching staffs of the medical schools in London and elsewhere, the need for recognizing more fully the great importance that should be given to preventive medicine in the medical curriculum.

THE HARVEIAN ORATION OF  
SIR GEORGE NEWMAN

**T**HOUGH the Harveian Oration has been delivered more or less continuously year by year on St. Luke's



Day since the inauguration of the feast by Sir William Harvey in 1656 in commemoration of benefactors of the Royal College of Physicians, of which he was a Fellow, not many of the orators have been engaged in the public health and preventive medical service. Even so it is doubtful if any had such claims to speak of preventive medicine or to be regarded as an orator as Sir George Newman. In choosing to speak of the advances made within the past century in the prevention and control of disease, Sir George provided himself with an opportunity of paying tribute to many benefactors not only of the College of Physicians but of mankind as a whole. Also he provided a treat for those privileged to be present in the beautiful library of the College, for when it comes to medical history Sir George is particularly apt to prove interesting to the point of fascination. On this occasion he certainly gripped his hearers, and had the surroundings been other than they were there might have been marked expressions of enthusiasm. However, it is difficult to be other than supremely conscious of a need for decorum when you find yourself surrounded by ceremony that

smacks of the 17th century, and by a collection of distinguished physicians all in scarlet robes, with Lord Dawson of Penn clad in a robe of black and gold in his place as President and with the golden mace resting upon its cushion before him.

By ancient custom the whole business of this meeting should be the oration, and at its end the President should depart in procession accompanied by the high officers and councillors. On this occasion there was a departure from the established order to permit of reference to the loss sustained by the death of Dr. T. H. C. Stevenson, Superintendent of Statistics in the office of the Registrar-General, to whom there had been awarded, but not presented on account of the illness that had proved fatal, one of the medals (the Bisset Hawkins Gold Medal) in the gift of the college. St. Luke's Day is a very full one for the Royal College of Physicians for, in addition to listening to the oration in the afternoon, they attended church in the forenoon to hear the Dame Sadleir Sermon and in the evening took part in a banquet. And so to bed. CHARLES PORTER, M.D.

*London*

Members and subscribers are requested to send notification of any change of address to the office of the Association as promptly as possible.

# PUBLIC HEALTH ADMINISTRATION

## SHORT SCHOOLS FOR MILK CONTROL OFFICIALS

SARAH VANCE DUGAN

*Director, Bureau of Foods, Drugs and Hotels, Kentucky Board of Health  
Louisville, Ky.*

IN order to develop uniform procedures and improve methods of milk supervision in the State of Kentucky, the State Board of Health conducted in different sections of the state during August, 1932, three schools of instruction, each of 3 days' duration. One school, at Henderson, included the full-time health officers and inspectors of 11 counties; the sessions at Murray included the personnel of 7 counties; while those at Georgetown included the personnel of 12 counties.

Each school was located where space was available for the travel laboratory equipment loaned by the American Child Health Association and for a classroom for lectures and demonstrations. Lectures were given by representatives of the U. S. Public Health Service, the American Child Health

Association, and the State Board of Health. After the lectures dealing with special aspects of milk control, the class was divided each day into groups for dairy farm or milk plant inspections, for collection of route samples, or for laboratory demonstrations. The course covered safe water supply and waste disposal methods, including construction of practical toilets in rural areas.

Certificates were awarded to those who attended all the sessions of the course. Opportunity was given for free discussion and questions by students. As a means of informing a large number of inspectors and health officers of the methods of inspection, we believe that these schools were extremely valuable and that they stimulated greater activity in milk work in the county health units.

**New Health Center in Milwaukee**—On October 14, the new Matthew Keenan Health Center, made possible by a gift of \$175,000 from the trustees of the Keenan Endowment Fund, was dedicated. A modern L-shaped building two and one-half stories high has been constructed to serve as a health department headquarters and clinic center for the northwestern section of Milwaukee. This institution is dedicated not to the treatment of disease but to the conservation of health and the prevention of disease.

The services which the Health Center will provide will include consultation

and diagnostic service in chest conditions; X-ray facilities; public health nursing service; diphtheria, smallpox, and typhoid fever immunization; dental service for indigent children; eye, ear, nose, and throat consultation for indigent children; sanitary inspection; educational activities; and the promotion of child welfare. In addition to modern examining and diagnostic facilities, a small laboratory, dental clinics, an X-ray department, a large assembly room to serve the 27 public health nurses who work in this area is found on the second floor.

Popular health education has not

been overlooked as there is an auditorium with a seating capacity of more than 200 located in the basement. This auditorium contains a 20-foot wide stage with flood lights, curtain, and dressing room with a projection booth for motion pictures. This new health center is completely described and well illustrated in the October, 1932, *Bulletin of the Milwaukee Health Department*.

**Childhood Tuberculosis**—In June, 1921, the Lymanhurst School for Tuberculous Children was opened in Minneapolis. A 10-year progress report has been prepared. It is recommended that the present institution be enlarged in order to care for all children of school age who have demonstrable tuberculosis. The Mantoux intracutaneous test has been accepted as a standard because of its accuracy through its measured dosage of tuberculin and because it is desirable that such a test become the standard throughout the country. This test is used to screen out children suspected of having tuberculosis, the positive reactors being given the X-ray examination and more detailed physical examination. The need of careful history taking in every case is emphasized. The sharp line which was previously set up to separate tuberculous infection from tuberculous disease has been disregarded. Every child with a positive tuberculin reaction is looked upon as one with the first infection or the childhood type of tuberculosis. The report presents quite in detail many of the high points of the research work carried on at the Lymanhurst School.—J. A. Myers, *Childhood Type Tuberculosis*, Lymanhurst School for Tuberculous Children, Minneapolis, 1932.

#### HEALTH DEPARTMENT REPORTS

**Madera County, Calif.**—The first comprehensive report rendered by the health unit in this county of 17,164

covers the period April 1, 1931, to May 31, 1932. This is a very readable document, containing sound philosophy as well as local factual material. In addition to the services of the county health officer, county nurse, and school nurse, the county received coöperation from the state department of health in the conduct of baby clinics, 2 or 3 days a month, the estimated cost per day being \$10. Several calculations are made to show the financial value of the unit to the county. For example, a smallpox vaccination campaign conducted during the year would have cost the county, had the work not been done by a health officer, close to the total amount spent for the health unit in a year. Following a case of psittacosis contracted from a love bird with the disease, a regulation was prepared by the county to govern the sale of love birds and parrots.

**East Orange, N. J.**—The 1931 health report is well up to previous high standards obtained by the earlier records. In connection with preschool work, the department has gone a step in advance of the delivery of birth records to mothers by nurses. With postcard acknowledgments to physicians, the doctors are asked whether at the end of 6 months they will vaccinate and immunize the new child, or prefer that these procedures be carried out by the health department. Of the doctors returning these cards, 20 per cent referred the procedures to the department. A letter urging the necessity of these protective measures is addressed to each parent when the child is 6 months of age, and with the letter is a postcard to be returned to the department with the necessary data for record when the procedures are completed. When the child reaches 1 year of age, a birthday letter is sent to him personally. This greeting urges not only protection against smallpox and diphtheria, but promises a Blue Ribbon

Certificate of Merit with the department's seal to all children who have not only had these protections but have had a complete medical and dental examination with correction of such defects as are discovered during the year before entrance to school.

**Montclair, N. J.**—Included in the comprehensive report of health activities for 1931 is a record of the first year of the generalized program in the amalgamation of the nursing service of the community under a bureau. A marked increase in the volume of nursing service rendered seems to be the experience since generalization was introduced. A saving in the budgets of various nursing agencies is noted in spite of reduced collections. Office management, supervision, and record work were simplified.

**Hygienic Institute, Ill.**—This 17th annual report, for the year 1931, contains an attractive photograph of the health center, a detailed organization chart, and a reproduction of the U. S. Chamber of Commerce award to LaSalle for accomplishments in health conservation. Immunization work has been extended in the health unit area, and communicable disease incidence was low. There has been but 1 death in 8 years from diphtheria in the population of 26,180.

Attention is directed to school physical examination records for the latter part of 1931 which indicate increased underweight, increased carious teeth, and lower percentage of correction of defects.

**Kanawha County, W. Va.**—In the space of a few well printed pages, bound in attractive covers, the county health officer has prepared a report of the health unit which is clear, interesting, and convincing. In the education field, school teachers provide health certifi-

cates, most of the examinations being made by the health officer. Some two-fifths of the population have been immunized against typhoid, while 50 per cent of the children under the teen age have been given protective doses against diphtheria.

Prior to the institution of the health unit, it was not unusual to have 300 to 500 cases of smallpox in the county every winter. Not over 10 per cent even of the teachers were protected. The 30,000 school children are reported protected, as well as the teachers. The people of the country "are free from this disease and there is no danger of its return while they practice prevention."

**Los Angeles County**—The California Taxpayers' Association in July, 1932, published a report of a survey of public health services in Los Angeles County which is of more than passing interest to administrators. There are 4 major health departments in the county, those of Los Angeles County, Los Angeles City, Pasadena, and Long Beach, beside a few small local departments. The county health department handles all health problems in the rural areas and in 35 of the 45 incorporated cities. The 3 city health departments handle the health problems within their respective areas and also inspect dairy farms in several other counties.

The survey report shows existence of duplication *between* and *within* departments. "Overlapping of responsibility and duplication of services now performed by the larger public health agencies in Los Angeles County can be eliminated by combining them into one department. A merger of the health services of Los Angeles City, Pasadena, and Long Beach under contract with the county would result in estimated savings of at least \$200,000 annually." The report shows that taxpayers within these larger cities having their own

health departments are also aiding in the support of the County Health Department—an investment from which they receive no return.

Winnipeg, Canada—In 1931, a resident death rate of 7 per 1,000 people, and an infant mortality rate of 49 (per 1,000 live births) are recorded. These are commendable records for this city of 212,815. The net costs per capita of services for which this health department is made responsible are interesting: control and prevention of disease (strictly health service) \$.59; scavenging and refuse disposal \$1.09; street cleaning and flushing \$.47; public comfort stations \$.14; public baths \$.22.

With reference to infant hygiene work, the report indicates that the visiting nurses are regarded as the first line of defense against disease, there being 39,797 calls made to babies' homes by 13 nurses, in addition to 180 visits to boarding homes. The 6 child welfare stations form the second line of defense, proving useful for keeping in contact with infants not requiring regular home visiting, and for preschool children who have been dropped from the nurses' visiting lists. There was an attendance of 9,125 for 289 afternoon sessions. The Babies' Clinic for feeding cases at the Milk Depot forms the third line of defense. To the clinic are referred cases which require modified feedings when parents cannot afford a private physician.

Territory of Hawaii—A very careful and thoughtful analysis of the tuberculosis problem in the Territory of Hawaii has been made by the Tuberculosis Committee of Palama Settlement, organized in 1931. The 84-page report is well illustrated with charts,

graphs and statistical tables. The task of bringing together and digesting a large amount of data was a joint community enterprise, and the foreword gives particular credit to a committee of the American Association of University Women.

The Territory of Hawaii consists of 8 inhabited islands divided into 5 counties with a total population of 375,000. The governmental expense is about 12 million dollars annually, with 1 million roughly for the Board of Health. Nineteen per cent of the health budget was for tuberculosis hospitals. The total estimated expenditure for all phases of tuberculosis work in 1931 was approximately \$1.80 per capita. Tuberculosis, the third cause of death, causes approximately 400 deaths annually in the Territory. For the past 4 years, 2.72 cases per annual death have been reported.

The Board of Health was established in the islands in 1850; tuberculosis was given attention in the program in 1900; and a separate tuberculosis bureau was created in 1910. There is in Honolulu a complete chest clinic under the Board of Health. Leahi Home (sanatorium) holds semi-monthly clinics for follow-up of discharged patients. A semi-monthly diagnostic clinic was also held during 1931 at the Japanese hospital. In addition, 35 chest clinics are held in various localities in rural districts of the Islands. There are preventoria on all the large islands, actively utilized. There are only 56 public health nurses in the Territory, most of them on a generalized basis, all effectively organized. The new Tuberculosis Committee has launched upon an active education program, and has already obtained commendable results from its first Seal Sale Campaign.

# LABORATORY

## THE APPLICATION OF A YEAST EXTRACT MEDIUM TO A TEST FOR DETERMINING QUALITY OF MILK \*

E. D. DEVEREUX

*Michigan Agricultural Experiment Station, East Lansing, Mich.*

IN an effort to find a method which would give a reading more nearly representing the actual ability of the bacteria and enzymes present to produce the changes in milk of interest to the producer and consumer, the bromthymol blue milk test or colorimetric hydrogen ion method for determining the keeping quality of milk was devised by Cooledge<sup>1, 2</sup> in 1920. Several optional changes were suggested by Devereux<sup>4</sup> in 1928. The correlation coefficient between the test and the keeping quality was found by Cooledge to be + 0.75. In a comparison of the bromthymol blue test and the methylene blue reduction test Devereux<sup>5</sup> found the coefficient for each test to be + 0.77, which confirmed the work of Ellenberger et al.<sup>3</sup> on the methylene blue test, their coefficient being + 0.72 ± 0.02.

From the above data it may be concluded that the two tests are comparable as judged from the standpoint of accuracy. The methylene blue test is more easily applied, requires less equipment, and readings are made after relatively short incubation periods (20 min., 2½ and 5½ hours). However, short incubation periods might at times be a disadvantage in that they require the attention of the operator for several hours after starting the test, a point which has been called to our at-

tention. The bromthymol blue test does not require the attention of the operator, in the great majority of cases, for 6 hours after the tubes have been inoculated.

### EXPERIMENTAL

In an effort either to shorten the incubation period or improve the efficiency of the test, or both, a yeast extract medium<sup>6</sup> was substituted for the Cooledge broth. This new medium differed from the Cooledge broth in that dextrose was added, and yeast extract and peptonized milk were substituted for beef extract and peptone. The complete formula is given here.

#### YEAST EXTRACT MEDIUM

Yeast extract (Difco)	5 gm.
Peptonized milk (Difco)	10 gm.
Sodium chloride	5 gm.
Dextrose	10 gm.
Dibromthymolsulphonaphthalein (Bromthymol blue)	0.020 gm.
Distilled water	1,000 c.c.
Adjusted to pH = 7. Autoclaved at 15 lb. for 15 minutes.	

In the experimental work with the yeast medium the test was compared to the actual keeping quality of the milk, using time as the standard.

One hundred 200 c.c. samples of milk were taken in 250 c.c. sterile Erlenmeyer flasks from the receiving vats of two dairies. The test is made by adding 0.1 c.c. of the milk in question to 10 c.c. of bromthymol blue broth

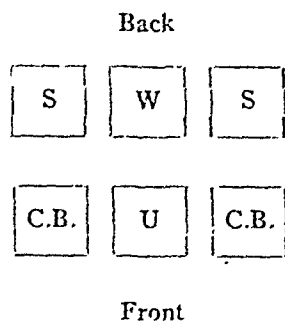
\* Journal Article No. 120 (n.s.), from the Michigan Agricultural Experiment Station.

and noting the rate of pH change when incubated at 37° C. until a pH of 5.8 is reached or until the tube has been incubated for 8 hours.

Bromthymol blue color standards\* having a pH range of 5.8 to 7.4 (5.8, 6.0, 6.2...., 7.4) are used for making the readings.

Broth without the indicator is also prepared and used in the compensating blanks. The compensating blanks are inoculated and incubated in the same manner as the broth tubes containing the indicator. It is necessary to prepare only two compensating blanks for one day's run on any one batch of samples.

When it is desired to make a reading, the tubes and the compensating blanks are removed from the incubator, cooled to 20° C., and placed in the comparator. The top view of the arrangement of the tubes in the comparator when a reading is to be made is given below.



Additional  
storage  
space  
for color  
standards

Additional  
storage  
space  
for color  
standards

- S = color standard  
W = water blank  
C B. = compensating blank  
U = unknown containing the milk in question

The unknown is compared to the color standards and the pH noted.

Cooledge devised a table in order that the milk could be scored, its keeping quality determined, and the purpose for which it is best suited determined. From experience with this table the author is of the opinion that milk

scoring 70 or better is suitable for milk plant supply.

The keeping quality was measured by the time required for the milk to become unfit for table use as determined by taste. The samples were held at 18° to 20° C.

TABLE  
THE COMPARISON OF THE BROMTHYMOL BLUE TEST AND THE KEEPING QUALITY OF MILK

Time of Souring Hours	Number of Samples	Bromthymol Blue Test Yeast Extract Medium	
		Score range *	
24	13	35-55	53.5
26	7	35-55	49.3
28	9	35-55	52.7
30	12	60-75	66.6
32	12	60-75	66.0
34	6	80-100	79.1
36	13	80-100	77.3
38	9	80-100	80.0
40	2	80-100	77.5
42	1	80-100	85.0
44	3	80-100	90.0
46	13	80-100	98.0

100

* Score range	pH	Score	Milk Suited for
Reading hours			
1, 2, 3	5.8	20-30	Condemning
4, 5, 6, 7, 8	5.8	35-55	For butter making
8	5.9-6.2	60-75	Condensing
8	6.3-6.7	80-100	Market milk or cheese making

In the table the results are arranged according to the time required for the samples to become unfit for use. Since souring was, in the great majority of the cases, the first undesirable quality displayed, the column is headed "Time of souring." The individual cases, that is, the score of each sample (data too voluminous to present), not the average scores, was used to calculate the correlation coefficient between the test and the keeping quality. The coefficient was found to be +0.86 ± 0.02, which indicates a decided increase in the efficiency of the test when the new medium was employed.

Duplicate tests were made on 50 of

\*The test has been so devised that the color standards and comparators, of either the Hynson, Westcott, Dunning & Co. (use test tubes with a diameter of 1.6 cm.) or the LaMotte Chemical Products Co., can be employed (use tubes with a diameter of 1.5 cm.).

the samples using broth made according to the old formula and it was noted that acid development was more rapid in the yeast medium. This was particularly true with milk having a score of 50 or below according to the yeast medium. There were not enough samples of poor quality milk examined to warrant any conclusions on this point. While it was apparent that poor milk could be detected 1 to 2 hours sooner when the new medium was employed, insufficient data prevented the determination of the accuracy of the medium on milk of poor quality.

#### SUMMARY AND CONCLUSIONS

By changing the formula of the medium used in the bromthymol blue milk test the correlation coefficient between the test and the actual keeping quality of the milk was increased from  $+0.75$  or  $+0.77$  to  $+0.86 \pm 0.02$ ; which is also an increase in accuracy over the methylene blue reduction test.

There were indications that the use

of the new medium would permit earlier detection of milk of poor quality. The employment of this test, regardless of medium used, does not require the attention of the operator, in the great majority of the cases, for 6 hours after the tubes have been inoculated. The test, due to its high degree of accuracy and applicability, should be applied to the determination of quality of other dairy products.

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## A YEAST EXTRACT MEDIUM FOR THE EXAMINATION OF MILK \*

E. D. DEVEREUX

*Michigan Agricultural Experiment Station; Michigan State College,  
East Lansing, Mich.*

DURING some recent researches on the isolation of lactobacilli and streptococci from the oral cavity a yeast extract medium was devised. Later, the ability of this medium to support the growth of milk organisms was determined; in addition to the common milk organisms this experiment included: *Lactobacillus acidophilus*, *L. bulgaricus*, *Brucella abortus*, *Streptococcus mastitis*. In brief the results were that the yeast extract medium in

either the broth or the agar form produced luxuriant growth of the common milk organisms. *L. acidophilus* and *L. bulgaricus* grew excellently in the broth and colonies of sufficient size were obtained in the agar medium that they would not be missed in routine plate counting.

*B. abortus* could not be isolated directly from infective milk by this medium: however, it did support the growth of laboratory cultures of this organism. *S. mastitis* also failed to appear on plates made from infective

\* Journal Article No. 97 (n.s.), from the Michigan Agricultural Experiment Station.



milk, but excellent growth was obtained in the yeast extract broth and agar media when laboratory cultures were used.

Needless to say, the above mentioned organisms grow very slightly if at all in plain nutrient broth or agar.

#### YEAST EXTRACT BROTH

Yeast extract (Difco)	5 gm.
Peptonized milk (Difco)	10 gm.
Salt	5 gm.
Dextrose	10 gm.
Water	1,000 c.c.

Adjust pH to 7.0; autoclave for 15 minutes at 15 lb. pressure.

To prepare the agar 15 gm. of washed agar are added to each liter of the broth, which necessitates dissolving in a steamer or autoclave.

At the present time several applications are being made of this medium; one using the broth, containing an indicator, for determining keeping quality of milk and one using the agar for determining the bacterial content of milk.

## VITAL STATISTICS

**Provisional Summary of Mortality from Automobile Accidents, 1931—** The Department of Commerce has announced that during the calendar year 1931 in the death registration area of continental United States, exclusive of the State of Utah, there were 29,547 deaths from automobile accidents, not including collisions of automobiles with railroad trains and with street cars. In 1930, in the same area, there were 28,950 deaths from this cause. The death rates were 24.9 and 24.5 for the respective years. The estimated population of the United States death registration area, exclusive of Utah, was 118,051,800 in 1930 and 118,740,600 in 1931. In these two years 47 states, the District of Columbia, and the 8 registration cities in the nonregistration State of Texas composed the area in continental United States, or 95.7 per cent of the total population.

Considering the states by geographic divisions, the Pacific group had the highest death rate in 1931 as well as in 1930. The rate was 34.6 per 100,000 population in each year. Next in order of groups in 1931 are the Mountain (28.9), the East North Central (28.0), and the Middle Atlantic (25.3)—each

higher than the rate for the registration area in either year. Contrasting these high rates with the low rates of the West South Central group (17.5), the East South Central (18.2), and the New England groups (20.8), it would appear that in the more thickly populated centers fewer automobile accidents take place.

Considering the states separately, those with the highest death rates from automobile accidents in 1931 were Nevada (68.5), Wyoming, (43.0), California (36.8), Florida (34.4), and Arizona (34.3), while in 1930 the order was Arizona, California, Florida, Nevada, and Wyoming. The rate for Nevada almost doubled, or 68.5 in 1931, as compared with 37.4 in 1930. The lowest mortality rates from this cause in 1931 were for Mississippi (14.0), North Dakota (16.1), Arkansas (16.5), Oklahoma and South Dakota (each 16.6), and Rhode Island (16.7). States with the lowest rates in 1930 were, in order of rate, North Dakota (11.6), South Dakota (16.1), Arkansas and Mississippi (each 16.5), Alabama (17.3), and Louisiana (17.6).

In the group of 92 cities of 100,000 or more population there were 9,594

deaths, or a rate of 25.9 per 100,000 population from automobile accidents in 1931, as compared with 9,555 deaths or a rate of 26.3 in 1930. The cities which had the highest mortality rates from automobile accidents in 1931 were Camden (84.0), Miami (52.4), Richmond (48.8), Chattanooga (47.5), Nashville (45.7), Jacksonville and Gary (each 42.5), San Diego and Indianapolis (each 42.2), Trenton (42.0), Tampa (41.0), Columbus (40.9), Toledo (40.4), and Bridgeport (40.1). Considering only accidents within the city limits, for certain cities, Trenton's rate was only 9.7, Camden's 31.1, Richmond's 22.2, Chattanooga's 23.7, and Tampa's 21.0.

The total number of deaths within a city should not be taken as the measure of the automobile hazard. The location of the city with reference to automobile traffic, the volume of traffic, hospital facilities, and other factors, should be considered. Camden, N. J., serves as an excellent illustration of this statement. There occurred 100 deaths due to automobiles in that city in 1931, but only 37 were due to accidents within the city limits. The remainder (63) were due to accidents outside. Other cities—Fort Wayne, Nashville, Richmond, Tampa, and Trenton—show large reductions when measured by this standard.—*Provisional Summary of Mortality from Automobile Accidents*. Dept. of Commerce. Bureau of the Census. Division of Vital Statistics. 1931.

**Infant Mortality Among Negroes in New York City**—During the past 20 years the infant mortality rate in the city of New York has dropped almost 50 per cent, the rate averaging 107 per 1,000 live births in the 5 years 1910-1914, and 59 during the past 5 years. Among the negro population in this city the corresponding figures were 209 and

104. In other words, the measures taken to reduce infant mortality were fully as effective among the negroes as they were in the rest of the population. While this is very encouraging, the fact that the infant death rate among negroes is almost double that among the population of the city as a whole, indicates the need of concentrating control measures on the sections of the city having large negro populations. Analysis of infant deaths according to cause, shows that tuberculous disease causes an undue proportion of deaths of negro infants. Whereas the infant death rate from all causes in negroes is approximately double the rate for the city as a whole, in tuberculous disease it is about 4 times the city rate. In infant deaths charged to malformations, the rate is actually lower among negroes than it is in the entire population. It is difficult to say whether the figures for this cause of death are significant for the number of deaths charged to negroes against malformations is small. Moreover, the death rate for "diseases of early infancy" (*International List* 1929 revision, Nos. 158-161) is distinctly higher among negroes.

Closely associated with infant deaths, are puerperal deaths. Among the general population of New York City, the death rate from puerperal causes has remained around 5 per 1,000 live births (6 in 1931); among negroes during the same period, it has been about twice as high, ranging between a low rate of 8 per 1,000 live births in 1923 and 15 in 1920. The puerperal death rate among negroes in New York City in 1931 was 13.—New York City Dept. of Health. *Weekly Bull.*, 21: 233-234 (July 30), 1932.

**Pernicious Anemia in Toronto, Canada, 1923-1926 and 1928-1931**—A review of the mortality statistics for Toronto, Canada, discloses a remarkable change in the death rate from

pernicious anemia since Minot's and Murphy's important discovery in 1926, of the benefits of liver therapy for patients afflicted with the disease. Allowing for certain influencing factors, such as the tendency toward better diagnosis, and differences in methods of classifying the causes of death, the death records for pernicious anemia in Toronto and elsewhere are none the less indicative of the great value of this new therapeutic agent.

In Toronto in 1927, the year immediately following the introduction of liver therapy, the death rate from pernicious anemia was reduced by nearly one-half, and the new lower rate has more or less continued throughout the past 4 years.

For purposes of comparison between the two periods of time, before and after the use of this new treatment, and in order to illustrate more effectively the substantial reduction that has taken place in the pernicious anemia death rate, the years 1923-1926 inclusive, and 1928-1931 are combined to make two 4-year periods. The year 1927 is excluded because its inclusion would result in differences of rates which would be of a negligible quantity. There was a total of 300 deaths attributed to pernicious anemia in Toronto during the period 1923-1926, this number of deaths representing a rate of 13.7 deaths per 100,000 population, while in the period 1928-1931 the number of deaths from this cause was reduced to 184, or a rate of 7.5. This marks a reduction in the death rate of over 45 per cent following the introduction of this new therapeutics.

Analysis of the pernicious anemia deaths according to sex and age groups, reveals interesting changes similar to those that have taken place in the statistics for diabetes mellitus after medical research had produced the insulin treatment. A prolongation of life is significant in the mortality records for both of these diseases.

In the case of pernicious anemia, comparison between the two selected periods shows that following liver therapy, 6.3 per cent more males and 12.9 per cent more females at time of death had attained the mark of 55 years of life or more. Excluding the more extreme ages at either pole of the life span (in which the occurrence of pernicious anemia is more or less uncommon), it is found that between the ages of 25 and 84, the average age at death has increased thus far, 3.6 years for males, and 4.5 years for females.

Specific death rates by sex and age groups between 35 and 79 years show, throughout, higher rates for females; they also indicate substantial reductions when comparison is made of the rates between the two 4-year periods, 1923-1926 and 1928-1931. Between the ages of 35 and 49 years inclusive, a greater reduction is shown for females than for males. The percentage reduction in the female rate is 75 as compared with 64.5 for the male specific rate. Above the age of 49 years, there is a greater reduction in the male rates. For males 50 to 64 years of age, the percentage reduction is 58.9 as against 51.5 for females; for the age group 65-79 years (the age which produces the highest rate of mortality from pernicious anemia), the reduction in death rate for males is 36 per cent or more than double the percentage decrease for females.—*Monthly Report of the Department of Public Health of the City of Toronto, Ontario, Canada, July, 1932, p. 1-3.*

Vital Statistics for New Zealand, 1931—Following a slight increase in 1930, the number of live births registered in New Zealand during 1931 continued on the downward trend, a total of 26,622. The birth rate, which has shown an uninterrupted decline since 1920, reached the lowest level on record with a rate of 18.42 per 1,000 of mean population. This compares

with a rate of 18.80 for 1930, a decline of 2 per cent. Fifty years ago, in 1882, the birth rate was 37.32 per 1,000 of mean population. Expressed in a more effective way, if the rate prevailing in 1882 had been recorded in 1931 on the present population, there would have been approximately 53,923 children born in the Dominion during the latter year, instead of only 26,622.

In spite of an abnormal year embracing a disastrous earthquake and an increase in virulence of influenza, the record of deaths for 1931 is much more satisfactory than that for 1930. Altogether 12,047 deaths were registered, as against 12,199 in the previous year. The corresponding death rates are 8.34 per 1,000 of mean population in 1931, and 8.56 in 1930.

The most remarkable feature of the vital statistics for 1931 is undoubtedly the phenomenal drop in the already very low infant mortality rate. In 1930 this rate stood at 34.48 per 1,000 live births, a figure slightly in excess of that recorded for the previous year. The interrupted downward movement, however, was again resumed in 1931, when the rate fell to the unprecedentedly low level of 32.15 per 1,000 live births. This represents a decrease of 68 in the actual number of infants succumbing during the first year of life. The decrease in the number of infant deaths registered in 1931, as compared with 1930, has taken place principally in the group of "diseases peculiar to early infancy."

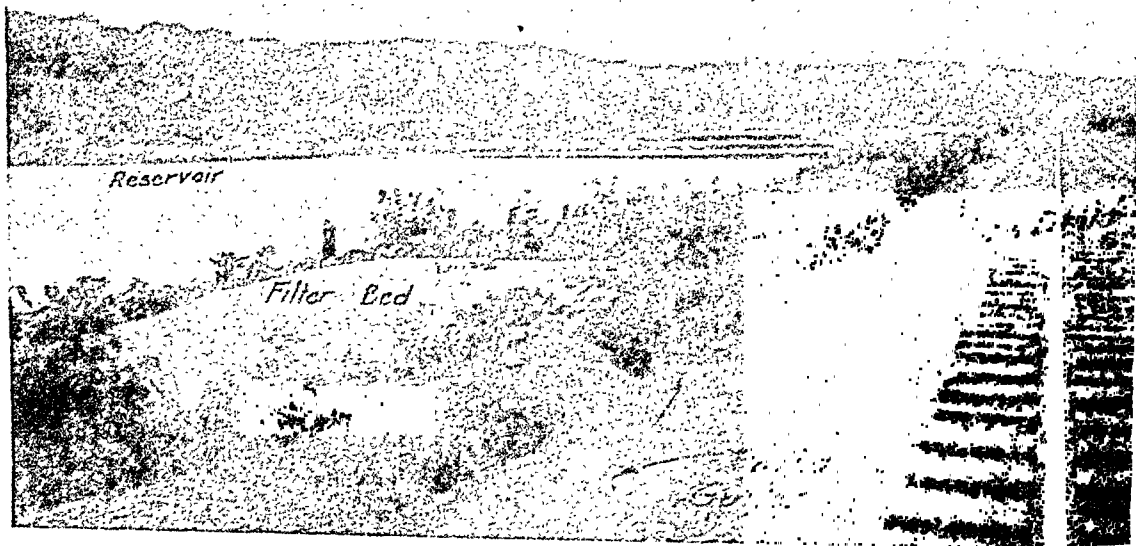
The stillbirth rate in New Zealand shows a rising tendency, but this is not sufficient to reverse the trend of the declining infant mortality rate when

stillbirths are taken into consideration with this latter figure. The unusually large decrease in both the number of infant deaths and of stillbirths for 1931 has had the effect of reducing the combined rate or "total infant mortality" to an unprecedentedly low level.

The health record of New Zealand for 1931 is even more satisfactory than that for the previous year. Improvements have been effected in unexpected directions, while very few outstanding increases in important causes have been recorded. With the exception of influenza, epidemic diseases were particularly quiescent during 1931. No deaths from measles were reported and a new low level for diphtheria (0.38) was reached. A most important feature is the reduction of 32 in the number of deaths from all forms of tuberculosis, bringing the death rate down to 35.5 in 1931, as compared with 45.5 in 1930. Principal diseases of the respiratory system, other than tuberculosis, also show a decrease of 196 deaths, or a 21 per cent reduction. Other important decreases were recorded for heart disease, which declined from a death rate of 203.3 in 1930 to 195.0 in 1931, meningitis from 4.9 to 2.8, and cerebral hemorrhage from 46.2 to 43.9, for the years 1930 and 1931 respectively.

On the other side of the picture, the cancer death rate increased from 101.9 in 1930 to 103.3 in 1931, influenza from 9.2 to 15.3, suicide from 13.5 to 15.6 and the death rate from accidental causes from 54.2 to 64.1. This marked increase in accidental deaths was due primarily to the earthquake on February 3, 1931.—*Report on the Vital Statistics*. New Zealand, 1931, pp. 5-12

# PUBLIC HEALTH ENGINEERING



1. View of track drainage filter bed on reservoir side of railroad

## FILTRATION OF RAILROAD TRACK DRAINAGE ALONG A MUNICIPAL WATER SUPPLY RESERVOIR

E. B. MYOTT

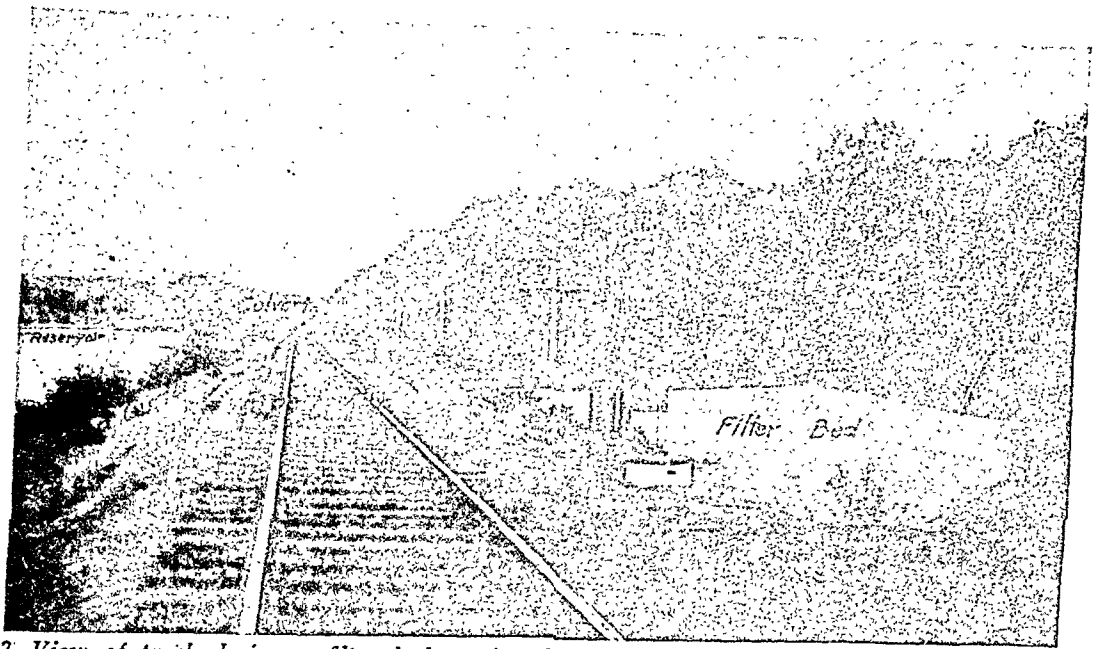
*Fay, Spofford and Thorndike, Consulting Engineers, Boston, Mass.*

THE City of Gloucester, Mass., recently built an auxiliary water supply reservoir which will furnish about 1 million gallons per day during extremely dry periods.\* The watershed of the reservoir lies adjacent to the built up portion of the city, but with the exception of 7 houses remotely situated from the reservoir, it is free from habitation and consists largely of undeveloped land. It is traversed, however, by a state highway and a railroad. The highway did not present any particular problem from a sanitary

viewpoint as all land adjacent to the highway could be acquired by the city, and, moreover, the highway was not in close proximity to the reservoir. The railroad, however, did present a problem which was given careful consideration since it caused much concern to the Massachusetts Department of Public Health, which has jurisdiction over all water supplies in the Commonwealth.

There are between 30 and 35 passenger trains operated over the railroad each day. The reservoir, which is nearly a mile long, lies adjacent to the railroad the greater part of its length, the normal water level being about 7

\* See "Babson Reservoir—Built in Six Months" in *Am. City*, Sept., 1932.



2. View of track drainage, filter bed on far side of railroad from reservoir. Effluent from filter bed passes under railroad through old railroad culvert

feet below the lowest part of the track. The gate house at the dam, where the water enters the distribution system, is only about 1,000 feet from the nearest point where the reservoir adjoins the railroad. The reservoir is small, having a capacity of 200 million gallons, of which 178 million gallons are usable. This is equivalent to about 178 days' supply on the basis of the safe yield of the reservoir. It is quite probable, however, that the stored water will be used at times in a much shorter period.

The engineers on this project were of the opinion that the possibility of the track drainage polluting the water supply was remote because toilets in the trains could be locked and their use prohibited while the trains passed through the watershed, the soil along the railroad was gravelly, and the track was ballasted with cinders. It was felt, also, that some natural purification would prevail in the reservoir; moreover, chlorination of the water would have provided sufficient protection against pollution if it were deemed necessary.

The Massachusetts Department of Public Health recommended that con-

sideration be given to the removal of the track drainage from the watershed. Studies showed that the practicability of such a scheme was questionable as it would have been necessary to build a watertight drain underneath the reservoir, extending to a point of discharge below the dam; the cost of the work would have been prohibitive. Subsequently, studies were made in conjunction with the engineering division of the Department of Public Health which indicated that a feasible method of safeguarding the purity of the supply would be by filtration of the track drainage, the effluent to be discharged into the reservoir. This method was approved by the department and the necessary works were built. This precaution was in conformity with one of the long established policies of the department, which requires that any possible pollution of public water supplies must be dealt with at its source before the water reaches the reservoir. The scheme of filtering the track drainage for precautionary protection against pollution is entirely practicable and no doubt worth while, particularly in the case of a small reservoir.

The work involved the construction of paved gutters and ditches along both sides of the track, where necessary, to collect the drainage and carry it to sand filter beds which were built at convenient low points along the railroad right of way. The sites of the beds were cleared, grubbed, and roughly leveled. The filter beds consist of 3 to 4 feet depth of sand of the same characteristics as that used for fine aggregate in concrete. No underdrains were provided in the beds. The capacity of the beds was designed for a rate of run-off, as computed by the rational method, using a rainfall intensity curve of 10-year frequency. The areas of the beds were computed for a filtration rate of 10 million gallons per acre per day. This basis of design is conservative; smaller beds might possibly have served the purpose fully as well as those built.

Six filter beds, having a combined total area of about 6,800 square feet, about 4,000 linear feet of paved gutters, and about 450 linear feet of ditches

were built to handle the drainage from about 4,000 linear feet of track. The construction cost, exclusive of engineering, was \$5,900 for the filter beds and \$6,300 for the paved gutters and ditches. The total construction cost per foot of track drained was \$3.05.

All construction work was done by the railroad through agreement with the City of Gloucester, which agreement further provides that all maintenance and repair work be done by the railroad at the city's expense. The railroad insisted upon these requirements so that it would not be necessary for any city employees to work on their right-of-way. An enabling act was passed by the Massachusetts Legislature authorizing the city officials to enter into this agreement with the railroad.

The railroad has coöperated fully with the city in the protection of the water supply. A standing order is in force requiring toilet doors in all cars to be kept closed and locked between stations where the reservoir is located.



*Courtesy of Aero-Scenic Airviews, Boston, Mass.*

3. Babson Reservoir, Gloucester, Mass.  
*Aerial view showing relation of railroad to reservoir*

## INDUSTRIAL HYGIENE

**Doing Away With the Open Window in the Hospital**—Air conditioning and sound control will be the most important subjects in hospital construction of the near future. The necessity of controlling outside noises necessitates changing the present form of window construction. Windows must be kept closed.

By the use of double or triple glass, with an air-space between, noise and draft, odors, dust, pollen, insects, etc., can be kept out, light at the same time being admitted. Such will also reduce by 50 per cent the expense of cleaning rooms, curtains, and draperies and the wear and tear on furniture and fabrics. The death rate alone from window accidents is enough to condemn windows and eliminate them from new construction.

Proper window construction will also keep out cold in winter and heat in summer. "By using a single glass, on a zero day with an inside temperature of 70° F., the glass surface temperature will be 17.3° F. With double glass the surface temperature will be 49° F., and with triple glass the surface temperature will be 59.9° F.

By means of a type of unit or cabinet ventilator for each room, air can be taken from the outside, filtered, humidified when necessary, and heated to the proper temperature in winter and cool in summer. The device can be made automatic, thus maintaining the desired temperature without requiring any continual regulating by hand. Even the steam radiator is removed. Such cabinets can be plugged in like a radio and will do away with large expensive power plants.

At the same time roofs and ceilings

will be insulated and reduce the first cost of heating plant by 60 per cent.

"By actual tests, for two winters, in several insulated buildings in Ontario, the temperature has not gone down below 30° F., although the outside temperature had dropped to 17° below zero. Yet no heating plants are installed in these buildings. The only heat available to keep them above the mean temperature outdoors during periods of extreme cold weather, is supplied by the sun and earth." (James Govan, architect, Toronto, *Transactions of A.H.A.*, 1931, p. 346.)

Even electric fans will be eliminated and cool, fresh, clean air will be gently diffused in every part of the room.

This temperature control will have a marked effect not only on patients but on the health and efficiency of employees as well. It would be a boon to asthma and hay fever patients.—Asa S. Bacon, Superintendent, Presbyterian Hospital, Chicago, *Modern Hosp.*, 39, 2:37-38 (Aug.), 1932. E. R. H.

**The Influence of the Humidity of the Air on Capacity for Work at High Temperatures**—Author's summary:

The physiological action of two subjects was investigated in air at a temperature of 70-100° F. and of 40-92 per cent of relative humidity. The experiments lasted 3 hours, and one of the subjects performed mechanical work (step climbing) at the rate of 14,000 kg. m. per hour.

The pulse rate was about 10 beats greater in dry air than in moist air of the same wet-bulb temperature. The winter observations agreed well with the effective temperature scale, but did not agree with the wet bulb, the dry bulb or the kata-thermometer scales.

Acclimatization effects showed themselves in experiments made at a dry-bulb temperature of 87° F. or more, but only very slightly in those made at 81° or less. Acclimatization was fairly well marked in the summer, the pulse rate being 5 to 10 beats less than in the winter, and no longer agreeing with the effective temperature scale.



The body temperature corresponded with the pulse rate, for it was 0.3–0.6° F. higher in dry air than in moist air of the same wet-bulb temperature, and was 0.15° lower in summer than in winter. The winter observations agreed well with the effective temperature scale.

The skin temperature of the face was found to depend on the dry-bulb temperature of the air, but that of the trunk showed no agreement with any of the scales. In moist air it was 1° F. lower than that of the face, and in dry air, 6° lower, owing to the cooling effect of increased sweating.

The gross mechanical efficiency fell off slightly at temperatures above 70 or 75° F. It was affected by the dry-bulb temperature of the air as well as the wet bulb, but not to the extent indicated by the effective temperature scale.

The weight of moisture lost by sweating corresponded well with the effective temperature scale. It increased gradually in consecutive experiments made in dry air, and diminished in those made in moist air.

The degree of fatigue experienced in dry air was considerably greater than in moist air of the same wet-bulb temperature, and it corresponded with the effective temperature scale.—

H. M. Vernon and C. G. Warner, *J. Hyg.*, 32, 3:431–463 (July), 1932.

E. R. H.

**Projected Study on Workmen's Compensation**—The Bureau of Medical Economics outlines some of the more important phases and tentative conclusions of its study of workmen's compensation.

The American compensation system (for industrial accidents and occupational diseases) came early to emphasize legal and financial features to the almost total neglect of the medical side. Physicians in the United States showed little interest in a movement that, within a generation, was to be a dominating influence in the practice of a considerable percentage of them.

At first the function of the physician was primarily that of an expert witness and in some instances no provision was made for medical care, while in the majority it was limited to from 2 weeks

to 30 days and the cost from \$25 to \$50. It was some time before it was realized that much depended upon the adequacy of medical care and there was a consequent rush to increase the amount of such care until today nearly half of the jurisdictions place practically no limit on the time and money granted for this purpose.

Today it has become evident that every phase of the administration of compensation rests for its success upon the skill of physicians and surgeons. Even the prevention of accidents is dependent upon mental and physical examinations, placement, treatment, etc.

Despite this, there is only one state in which the law provides for a physician in any official administrative capacity concerned with determining the policy of compensation and administration. Today between 70 and 80 million dollars are paid annually for the medical and hospital phases of compensation cases—a sum nearly twice as great as that paid to the physicians of Great Britain under a National Health Insurance System. In our system also there has been a tendency to introduce the most undesirable elements of commercialism into medical relations.

In some states, chains of clinics have arisen with salesmen who solicit business—for inferior service. The plant medical systems have been unduly stimulated by the profit motive of saving compensation rather than care for the patient. Recently these schemes have grown to include complete medical care, first of employees, then of their families, and finally of entire communities. "Pay-roll check-offs" have been legalized.

In all of this physicians have had little to say. It has been the work of laymen. Indeed, in some sections, physicians engaged in compensation and industrial work have lost touch and sympathy with the great body of practitioners and to some extent with the

traditions and ideals of the medical profession.

A critical point in the evolution of compensation seems approaching. Will a lay-controlled system of health insurance evolve for the industrial population, or a system of ethical care for workers directed adequately by the profession?

Among other industrial organizations the National Industrial Conference Board has recognized these issues. There is an immediate and urgent need for medical representatives in the administration of compensation.—*A. M. A. Bull.*, 27, 6:131-133 (June), 1932.

E. R. H.

**Report of the Royal Commission on the Use of Radium and X-Rays in the Treatment of the Sick, etc.**—There seems to be a definite relationship between the incidence of cancer and certain occupations: (1) Work in tar, pitch, and bitumen briquettes; (2) Work in mineral oil or paraffin or in any compound, product or residue of either of these products; (3) Work in arsenic; (4) Work in X-rays and radium; (5) Work in mines, e.g., the lung affection of Saxon miners called "Bergkrankheit"; (6) Chimney sweeps' work; (7) Work in anilin dyeworks.

The specific irritants of carcinogenic agents appear to require a long time to show their effects. In some instances the action of the irritant may have disappeared long before cancer declares itself. The oil bearing shales of Scotland and the lignite of Germany are prone to develop skin affections. Mulespinners' disease (epithelioma of the scrotum) is attributed to soaking of the parts by lubricating oils thrown off from the spinners. Approximately 2.5 per 1,000 of mulespinners develop this disease.

Arsenic cancer occurs in the manufacture of "sheepdip" and among tin smelters. X-ray cancer is, of course, well known. "Bergkrankheit" of Erze-

birge, Saxony, which causes malignant tumors of the lungs, has been known since 1897. The dust of the mines contains bismuth, cobalt, and arsenic while the air is radio-active. The affliction lasts for years, but proves fatal as a rule in middle life.

Chimney sweeps' cancer is probably as common today as ever it was—5 or 6 deaths from it a year in England. Bituminous coal dust from the Midlands is said to be the most tumor-producing.

The fact that Hoffman found no evidence of malignant tumors as a contributory cause of death in an analysis of nearly 2,000 death certificates of lead workers in the United States is significant in the lead treatment of cancer.

Statistics show in the last few years that cancer has steadily increased its toll among industrial classes both in Canada and the United States. The increase for the year 1931 as compared to 1930 was 8 per cent for cancer of the digestive tract and peritoneum, and 6.3 per cent in cancer of the breast.—John M. Robb, Minister of Health of Ontario, *et al.*, Legislative Assembly of Ontario, *Sessional Paper No. 41*, 1932: 171 pp. (see pp. 137-138). E. R. H.

**Physiological Response to Breathing Hot Air**—When subjects sitting at rest in a cool environment breathe hot moist air, the limit of tolerance lies between 140° and 150° F. (wet bulb). When doing work, the tolerance limit falls between 130° and 140° F. (wet bulb).

The local effects noticed are a transient sensation of burning in mouth and throat and reddening of palate and throat. With those at rest, there is an increase with some irregularity in the respiration rate. With those doing work, sweating is noticeably greater when the wet bulb temperature of the inspired air is above body temperature.

The limits of tolerance for subjects at rest and breathing hot dry air lie be-

tween 270 and 367° F. (dry bulb); corresponding limits for those doing work lie between 200 and 220° F. (dry bulb).

The local effects of breathing hot dry air are extreme dryness of mouth and throat with a slight sensation of burning in some subjects, frequent coughing, and slight reddening of palate and throat.

No general effects were observed as a result of breathing hot dry air.—Esther M. Killick, University of Leeds, *J. Hyg.*, 32, 3:332–339 (July), 1932.

E. R. H.

**Industrial Electrical Accidents in Their Neurological Aspect**—The author discusses historically and statistically the effects of the electric current upon the nervous system, including shocks, legal electrocution, and the fundamental matters of voltage, amperage, type of contact, resistance of tissues, duration of current, and the points of contacts.

The paucity of electrical injuries in Great Britain is largely due to efficient Home Office control. There are periodical inspection of apparatus, notification of accidents with subsequent inquiries, followed if necessary by prosecution.

The immediate treatment of electric shock consists in artificial respiration with the possibility of inhalation of CO<sub>2</sub> being of service. "Countershock" is discountenanced. Artificial respiration should be continued without interruptions for 4 hours, although there is no

unequivocal evidence in medical literature (with one possible exception) where life has returned after being suspended for more than ½ hour. Therefore case reports of such prolonged suspensions should be brought forward whenever they occur.—MacDonald Critchley, *J. State Med.*, 40, 8:459–470 (Aug.), 1932.  
E. R. H.

**Silicosis in the Pottery Industry**—The Home Office, Great Britain, has drafted regulations to combat as far as possible the silicosis risk inherent in the pottery industry.

The necessity for intervention is proved by the very considerable sum—£20,000—paid for compensation in 1930 in the china and earthenware industry, in respect of 98 new cases, 36 cases from the previous year, and 34 deaths. The regulations in question, known as the Draft Pottery (Silicosis) Regulations, extend the wide-reaching Code covering the manufacture and decoration of pottery, but include also premises in which flint is ground. They require the provision of effective exhaust ventilation for all dusty processes, a large number of which receive specific mention, with a concession consisting in permission to effect the work as an alternative by wet methods. The recognition of the use of a water or steam spray as an alternative to exhaust ventilation is, it is remarked, in contradiction to the view expressed at the Silicosis Conference at Johannesburg, where exhaust draught and the use of water was advocated. Cleaning by vacuum is permitted during working hours, and the Code is in general based on the dictates of common sense.

*Indust. & Labour Inf.*, League of Nations, 42, 7:242 (May 16), 1932.

E. R. H.

## FOOD AND NUTRITION

### The Value of Salmon Oil in the Treatment of Infantile Rickets— The authors summarize their work as follows:

Thirteen children with active rickets have been treated with salmon oil, and the response to treatment, as shown by clinical examinations, roentgenograms and determinations of blood calcium and phosphorus, has been recorded at intervals of 1 or 2 weeks. Oil was used which had been prepared from the waste products of three species of salmon, the Pink or Humpback, the Chinook or King, and the Sockeye or Red.

The oil was given in doses of from 10 to 20 c.c. a day, the average being 13.8 c.c. It was well taken and well tolerated by all thirteen children.

Response to treatment as shown by roentgenographic and blood studies was very prompt, and advanced healing was brought about in from 3 to 9 weeks.

Of the 6 children whose blood was studied after from 6 to 8 days of treatment, 5 showed definite increase in the serum calcium or serum phosphorus or both; 2 reached the normal level by the end of the first week, 3 by the end of the second week. Three children who were reexamined for the first time after 2 weeks' treatment showed a return in serum calcium and phosphorus to the normal level. Only 1 child showed a greater delay in response to treatment.

Roentgenographic evidence of response to treatment was equally prompt, 7 children showing the fresh lime salt deposits in 1 week, and 5 others in 2 weeks. One child did not show fresh deposits until the end of 3 weeks. Craniotables improved rapidly under treatment with salmon oil. Biologic assays for vitamins A and D were made of the three samples of salmon oil used. They showed that the Sockeye and Chinook oils were nearly equal in vitamin A potency to a composite sample made from nineteen medicinal cod liver oils, and that Pink oil was distinctly inferior in vitamin A potency. The Sockeye and Pink oils contained twice as much vitamin D as the cod liver oil composite, and the Chinook oil about 50 per cent more than the same sample of cod liver oil.

There is a potential supply of 1,000,000 gallons of salmon oil available through the salmon canning industries of the Pacific

states and Alaska. Approximately three-fourths of this would come from the species of salmon used in this study and shown to be potent in the treatment of rickets. About 370,000 gallons would come from the species of red salmon known to be high in vitamin A as well as vitamin D. The production at low cost of such a quantity of salmon oil would be of special value at this time, when the nutrition of many infants and children is suffering from lack of proper and adequate food.

Though exact comparison of the efficacy of salmon oil in the treatment of infantile rickets with that of other antirachitic agents cannot be made, it may in general be said that the salmon oil used in the present study was probably a more potent antirachitic agent than the average cod liver oil and compared very favorably in the rapidity of its action with viosterol. Like cod liver oil, salmon oil, especially that from the more highly colored species, has the advantage of providing vitamin A in addition to vitamin D. It also provides an apparently easily digested fat, and from the limited experience of this investigation would seem to be well taken and well tolerated.—

Martha M. Eliot, E. M. Nelson, Susan P. Souther and M. Katherine Cary, *J.A.M.A.* 99:1075 (Sept. 24), 1932.

**A Study of the Milk, Blood, and Excreta of Cows Fed Moderate and Excessive Amounts of Irradiated Yeast or Ergosterol**—The effective incorporation of vitamin D in milk, either through the feeding of irradiated yeast or irradiated ergosterol having been demonstrated, this work extends the study by feeding excessive therapeutic and toxic amounts of both of these substances, as well as undertaking to determine the effect of such doses on the cows.

Incidentally, it was found that the milk most satisfactory from the clinical standpoint was that from cows receiving 60,000 and 90,000 vitamin D units daily in the form of irradiated yeast.

This yeast is rich in vitamin B, each cow receiving about 3,500 units daily. It was found that the vitamin B in the milk was not increased by this procedure.

Moderate supplements either of irradiated ergosterol or irradiated yeast do not change the phosphorus or calcium concentration of the milk or cream. Cows which received about 450,000 units by means of irradiated yeast or about 1,500,000 units through irradiated ergosterol, showed a slight rise in the calcium and serum and a marked increase in inorganic phosphate.

In this connection the breed of the cows must be taken into consideration since this factor is of importance in relation to the output of milk. For example, the figures of calcium and phosphorus are comparatively low for the milk of Holstein cows, which can probably be attributed to the fact that cows of this breed secrete a large quantity of milk. The amount of vitamin D excreted was tested on cows receiving the normal supplements of irradiated yeast (about 300 gm.). No vitamin was recovered from the urine but the bowel eliminated about 25 per cent of the vitamin D ingested.

One of the cows receiving excessive supplements of irradiated yeast was slaughtered and the liver assayed. Assuming the beef liver to contain 3 to 5 per cent of fat, the fat from this liver contained from 20 to 30 units of vitamin D per gm., or an activity greater than cod liver oil. No instance of harmful effect of feeding excessive supplements was noted, based on lack of evidence of calcification or abnormal ash content of the ribs.

To determine the effect of the breed, similar amounts of vitamin D as irradiated yeast were given to three different types of cows, one producing a large quantity of milk with low butterfat, one with low production of milk with low butterfat, and the third

with low production of milk and high butterfat. This experiment showed that the lower the production of butterfat the lower the concentration of vitamin D in the fat, and the greater daily production of milk the greater total number of units of vitamin D incorporated in the milk.

This experiment warrants the conclusion that vitamin D supplement should be given according to the percentage production basis rather than as to the individual production of cows.—A. F. Hess, R. F. Light, C. N. Frey, and J. Gross, *J. Biol. Chem.* 97:369 (Aug.), 1932.

**The Chemical Nature of Vitamin C**—Since its discovery, hexuronic acid has been recognized as strikingly similar to vitamin C. Tillmans and coworkers (*A.J.P.H.* 22:1002, Sept., 1932) showed the close relation between vitamin content and reducing power of plant substances and concluded that the reducing factor and the vitamin were identical. Zilva found certain fractions of lemon juice with a high antiscorbutic activity but low or no reducing power, as well as fractions potent in reducing power but without antiscorbutic activity, justifying his conclusion that the reducing substances and vitamin C were not identical.

The present work was undertaken to confirm a previous test by these authors pointing to the identity of the two factors. The hexuronic acid used in the test was prepared in crystalline form from suprarenal glands of the ox and was 2 years old at the time of the experiment. The amount of acid was weighed out every 8 days and dissolved in water and aliquot portions fed by means of a pipette. Previous experiments having shown that 1.5 c.c. of lemon juice is a protective dose and that this amount contains approximately 0.5 mg. of hexuronic acid, in this test 1 mg. of hexuronic acid was used to

allow for exposure to air and age of the preparation.

Compared to the animals receiving the hexuronic acid, were positive controls which received 1 c.c. of lemon juice daily and negative controls on the basal scorbutic diet. Cod liver oil (0.5 c.c.) was given to each test animal per week. No scurvy was found in the animals receiving hexuronic acid on an average 90-day test. The animals receiving 1 c.c. of lemon juice showed some scurvy and those on the basal diet were markedly scorbutic. All of the negative controls died within 20 to 34 days. The animals receiving hexuronic acid showed normal growth and weight curves compared to those of the controls on lemon juice.

Since it is assumed that animals protected from scurvy for 90 days will remain so indefinitely, these authors conclude that vitamin C is a single substance identical with hexuronic acid.—Joseph Louis Svrbely and Albert Szent-Györgyi, *Biochem. J.* 26: 865, 1932.

**Vitamin C Content of Sheep-Liver: With Observations on the Effects of Freezing and Storage—**Aqueous extracts of sheep-liver were prepared and administered to guinea pigs to determine the antiscorbutic activity. Two methods were employed—(1) curative action on guinea pigs of graded doses of the extract in comparison with that of cabbage; (2) determination of the smallest amount of extract added daily to the basal diet necessary to prevent histological scorbutic changes in the teeth of normal guinea pigs.

In the first experiment, the animals were fed on a scorbutic basal diet of Sussex ground oats, 3,600 gm., bran 400 gm., dried egg-yolk 200 gm., and 1 per cent of cod liver oil was added daily. At the onset of scurvy and cessation of growth, daily doses of 10 c.c. and 5 c.c.

of liver extract were administered. For comparison, two other groups of animals were given 1 gm. and 0.5 gm. cabbage per day respectively, and in addition 5 c.c. autoclaved liver extract.

Control animals received (1) a fully curative dose of 5 gm. cabbage in addition to the basal diet; (2) basal scorbutic diet only. The animals were killed on the 14th day and histological examination made of the teeth and ribs. It was found that 5 c.c. of the extract compared closely with 1 gm. of cabbage, while, by the second method, the minimum protective dose lay between 5 and 10 c.c. of the extract.

Comparisons were made of the vitamin C content of (1) fresh sheep liver, (2) liver frozen at an average temperature of  $-19^{\circ}$  stored for 6 days and then thawed, and (3) liver frozen at an average temperature of  $-19^{\circ}$  and stored at this temperature for 6 months. There was a definite loss of antiscorbutic activity from liver stored at  $-19^{\circ}$  for 6 days and then thawed, 10 c.c. of the extract being insufficient to prevent histological changes in the teeth. The loss after freezing for 6 days is much less than that observed in the liver stored at  $-19^{\circ}$  for 6 months, 5 c.c. of the aqueous extract of the former being equal in effect to 10 c.c. of the latter.—Judith Isobel Mills, *Biochem. J.* 26:704, 1932.

**The Relation of Bovine Mastitis to Human Infection—**The common disorders incident to lactation in the milk secreting organ of the bovine are analogous to those in the human with certain differences. In human cases of mastitis, the staphylococcus is said to be the usual invading organism, while the streptococcus is less frequently associated with this condition. The reverse seems to be true in bovine mastitis.

In New York State nearly half the cases of all diseases which have occurred

in some 100 milk-borne outbreaks during 15 years have been associated with 10 septic sore throat epidemics. Six of these epidemics have been traced to herds in which cases of mastitis were found. In the more recent epidemics hemolytic streptococci were found which closely resembled organisms isolated from human cases. It is suggested that organisms from human sources are primarily responsible for all the epidemics of septic sore throat and scarlet fever in which mastitis is a factor.

Since January 1, 1924, in New York State there have been six outbreaks of gastroenteritis totaling 357 cases traced to the use of raw milk from cows suffering from mastitis. The types of streptococci which are the common incitants of bovine mastitis apparently are not infective for man, but when present in milk in large numbers, with their toxins, may be responsible for severe toxic disturbances, especially in children.

Bovine mastitis is a major problem in prevention of milk-borne infection.

Organisms of animal or human origin, pathogenic for man, such as the tubercle bacilli, *Brucella abortus*, and hemolytic streptococci, may be present in diseased udders. Udders infected with *Brucella abortus* may excrete the organisms during the life of the animal. Agglutination and complement fixation tests on milk from infected and uninfected quarters have given positive results and negative results respectively. Agglutinating power in the blood may be due to infection localized in the udder.

The author concludes that pasteurization is the only practical safeguard.—Paul B. Brooks, *J. Prev. Med.* 6:111 (Mar.), 1932.

**The Influence of Diet on Caries in Children's Teeth**—This is a preliminary report of a long-time investiga-

tion conducted upon about 400 children in three institutions to determine the effect of additions of vitamins A and D to the customary diet on the teeth during and after development.

The general plan followed consisted in adding to the diet of all of the children in one institution cod liver oil, in another treacle (molasses), and in another olive oil. At a later stage the children in the third institutions were divided into two groups, one of which received untreated olive oil and the other the same quantity of olive oil to which radiostol (irradiated ergosterol) had been added. Quantities of the various supplements were adjusted to the ages of the children.

Each child was given a detailed dental examination at intervals of 6 months. The present report deals only with the number of erupted teeth and the presence and extent of caries in the teeth erupted at the beginning of the investigation. A period of 2 years was covered in the first part of the investigation and 1½ years in the comparison of olive oil with and without vitamin D.

The data which were treated statistically showed that in the groups of children, numbering from 65 to 86, in the comparison of cod liver oil, treacle, and olive oil, the progress of caries in the permanent teeth was significantly retarded in those receiving cod liver oil as compared with those receiving the other two supplements. The increase in caries in the vitamin group during the period, whether measured by incidence or extent, was only about one-third that in the other two groups. In the two groups of children, numbering 82 and 79, respectively, receiving olive oil alone and supplemented with vitamin D, the progress of caries in the permanent teeth was also significantly retarded in the vitamin group. With suitable allowance for the shorter time there seemed to be no appreciable difference in the rate of increase of caries

in the group receiving cod liver oil (vitamins A and D) and radiostol (vitamin D).

These findings are thought to justify the conclusion that the potent factor in retarding the development of caries in

fully, or nearly fully, calcified teeth is vitamin D.—N. G. Bennett *et al.*, Great Britain Med. Res. Council, *Spec. Rep. Ser. No. 159*, 1931, p. 19, figs. 3). Abstract *Exper. Sta. Rec.*, 67:341 (Sept.), 1932.

## CHILD HYGIENE

### TUBERCULOSIS IN CHILDHOOD

THE prevention of tuberculosis continues to be one of the major problems of public health. At present considerable attention is being focused on childhood tuberculosis. The principal sources and modes of infection have become well known during the 50 years since the discovery of the tubercle bacillus by Koch. An enormous amount of study has been devoted to problems connected with the origin, spread, and prevention of the disease. Since measures for its prevention have been applied more intensively, there has been a gradual reduction in the death rate from tuberculosis, more marked in the younger age groups. While this is true, it still remains one of the important communicable diseases affecting children, especially in the preschool age and during adolescence. While the death rate during the preschool period is relatively low, the rate of infectivity is very high. A great deal of data has been accumulated on this point since we have been applying systematically the tuberculin test and the X-ray.

On the other hand, while there has been a diminution in the tuberculosis death rate between 15 and 25 years of age, this has been most marked in the male. Females between these ages have not shown this decided decrease. This was clearly pointed out by Howard Whipple Green in his *Graphic Analysis of the Trends in the Tuberculosis Death-Rate*, which report was pub-

lished in March, 1927. Since that time a number of other studies have confirmed his observations. Recent attempts have been made to determine the exact cause for this lag in the reduction of the tuberculosis death rate among young women.

Kendall Emerson, in a summary of the outstanding facts concerning tuberculosis<sup>1</sup> says that:

1. One out of every 5 persons who die between the ages of 15 and 45 dies of tuberculosis.
2. One out of every 3 young women who die between the ages of 15 and 30 dies of tuberculosis.
3. Tuberculosis kills more children under 21 than any other communicable disease.
4. It is estimated that 2,000,000 children have been infected with the germs of tuberculosis—and it is from these children that most of the active cases will come in later years.

The foci of tuberculous infection are mainly two, the tuberculous individual disseminating the organisms largely from the respiratory tract, and the tuberculous cow contributing the organisms directly through milk from diseased udders or indirectly from milk infected by the tubercle bacilli lodged in dust from infected excreta. Undoubtedly bovine infection is becoming less and less common in this country, as pasteurization and boiling of the milk before giving to children have become more widespread.

The campaigns for the eradication of



tuberculosis among cattle and the more rigid application of pasteurization undoubtedly have been responsible largely for the reduction in the amount of bovine infection. There is no question that tuberculosis of the bones and joints and of the cervical lymph glands has decreased markedly in this country within the last 25 or 30 years. However, we still have reports from other countries, notably certain parts of Canada, Great Britain, and Scotland, which still show a considerable proportion of children infected with bovine tuberculosis. We, therefore, should not cease in our efforts to eradicate the tubercle bacillus in cattle while we are engaged at the same time in a more active struggle against infection of children from tuberculous contacts in their home environment. Kendall Emerson further warns us that "Optimistic prophecies about the early eradication of the disease are not only a disservice to the community, but are not borne out by facts."

A recent study of tuberculosis mortality among young women<sup>2</sup> confirms former observations and also brings out some very interesting correlations.

This failure of the tuberculosis mortality among young females to keep pace with the decline in the general tuberculosis death rate, together with the fact that the peak of tuberculosis mortality for both sexes and all ages up to 65 years falls among girls from 15 to 25, is probably one of the most striking points in any study of tuberculosis deaths in the United States. Its importance is emphasized further by the fact that between the ages of 15 and 25 years the death rate among young women ranges from 50 to 90 per cent higher than among young men of the same age.

However, the increasing disparity between the male and female rates is not, as is sometimes believed, a reflection of rising death rate among young women. . . . The death rate among females from 15 to 19 years of age has decreased by 46 per cent since 1900, and for young women 20 to 24 years of age there has been a decline of 53 per cent. . . .

As far back as we have any reliable information (1900), tuberculosis has been a

serious problem among young women. If we should say that tuberculosis among all groups of the population *except young women* is a *decreasingly* serious problem, we should be stating the present situation much more accurately than we do when we speak of its *increasing* seriousness among young women. The problem itself is not growing and has not been newly generated; it simply appears larger and clearer as the importance of its background fades.

The main conclusions of Miss Nicholson in this study, while not agreeing entirely with similar studies, still bring out in contrast some suggestive points which should be investigated further.

On the whole, it is the opinion of this investigator that the problem of tuberculosis among the young women of Detroit during 1930 was primarily a problem of the child-bearing period and of the period during which physical development constituted a more or less consistent strain upon the strength and general health of the young woman. The importance of such living habits as a lack of sufficient sleep, and such environmental factors as broken homes, is noticeable but seems secondary to the other elements in the situation.

Only by such studies can we hope to arrive at a complete knowledge of this protean disease.

The study by Howard Whipple Green of the situation in Cleveland does not agree with certain of the findings in Detroit. In his *Tuberculosis and Economic Strata, Cleveland's Five-City Area, 1928-1931*, Green finds enormous differences exist in the tuberculosis death rates and case rates in the various economic areas.

The age specific death rates by sex for the low and high areas are worthy of study. In the low area the male rate is quite similar to the female rate to age 25 after which time the male rate is considerably higher. In the high area, however, these rates are quite similar throughout, both being much lower at all ages than is the case in the low area. The rates for the colored population in the low area are quite different from the rates for the white population and much higher.

His general conclusion is that "not only tuberculosis but other ills of

humanity are accentuated by economic status."

An excellent report on Tuberculosis Service for Children by Dr. Margaret Witter Barnard in the October, 1932, issue of the *Milbank Memorial Fund Quarterly Bulletin* states:

Our increasing knowledge of tuberculosis in children is opening up a highly specialized field. . . .

In order effectively to safeguard the tuberculous child, it is necessary to know whether or not there are other cases of tuberculosis in the family group and how great the risk of further exposure to infection will be if the child remains in the group. The complexity of family situations in cases of tuberculosis in children may be graphically illustrated by charts such as those given. . . . These are based on data gathered in the tuberculosis clinic services for adults and children at the Bellevue-Yorkville Health Center over a period of years. . . .

If tuberculous children are to be cared for intelligently, not only must the clinic view the problem as a family situation but the family must also be educated to a similar viewpoint. In this manner only may the coöperation of the family be secured.

The four objectives of a tuberculosis service for children are stated as follows:

1. To screen out the children with tuberculosis and to determine the significance of their lesions.
2. To plan adequate care for them, including finding the source of their infection and breaking the contact.
3. To educate the families to regard tuberculosis as a family problem and to help them make adequate plans to deal with it.
4. So to record and assemble all data that they will be available for use in further studies of the general problem.

The children's tuberculosis clinic should offer diagnostic service to children from several sources. Child contacts of patients in the adult tuberculosis service should be referred as a matter of routine to the children's service for examination. Not only is it of importance to detect all tuberculosis in this group, but also through these examinations to gain a picture of the general health problems with which the family must deal. Social agencies, school physicians and nurses will wish to refer to this clinic children who present suspicious symptoms or history of

exposure. And the child hygiene services will constantly use this special service for consultation. Routine tuberculin tests, followed by X-ray examination of the positive reactors, in the infant and preschool groups will screen out a number of children who should be referred for further consultation on diagnosis and care. Although a well organized and integrated tuberculosis service for children is costly, it will show very definite results both in controlling the disease in children and as a method for case finding among the adult contacts. When funds are limited, experience indicates that two groups showing the most significant lesions, needing the most intensive care, and giving the best results are the preschool and the adolescent.

The important diagnostic procedures which should be carefully standardized and of a high technical quality are:

1. Complete pediatric examination
2. Intradermal tuberculin test
3. Flat and oblique X-ray

On these data, in conjunction with a careful history and an understanding of the home conditions of the child, will be based the disposition of the case. Because it is impossible to separate tuberculosis in a child from his general condition, the physician in charge of this service should be a competent pediatrician.

Dr. Barnard states clearly that the preschool and adolescent groups present an extremely difficult problem.

Since it is in them rather than in the 6 to 12 year old group that significant lesions requiring institutional care seem to be found most frequently.

She stresses the fact that

Experience shows that children of the school age group handle tuberculous lesions remarkably well and that intelligent home care is usually sufficient.

This fact is brought out also by Dr. W. P. Shepard in a discussion of the contribution which Lymanhurst has made to the tuberculosis movement,<sup>2</sup> especially from the standpoint of a public health problem. He quotes Homer Folks as saying many years ago that the main objectives of the antituberculosis movement of case finding, treatment, control of spread, and education

are the ones which we are still employing today and that practically no new major item has been added to the program. However, a great development has taken place in the application of the various technics which have been elaborated for the discovery of tuberculosis. In other words, there have been no new objectives, but numerous new methods of obtaining the objectives.

The most important development has been the recognition of the tuberculosis movement as a general public health movement. Dr. Shepard feels that one of the outstanding contributions of Lymanhurst to the antituberculosis movement was the successful demonstration of what is needed and what is possible to modify the public school curriculum to meet the health needs of the school child. He points out that

In the tuberculosis field alone the adoption of this principle is markedly changing our administrative procedure. It completes, according to our present knowledge, the circle of tuberculosis protection thrown around the individual. Ideally, now, we have a home free from contact. Missing that, the child with early infection that threatens disease is given special care in the health-school. Missing that, the preventorium is available. Missing that, the sanatorium is available for cure.

Dr. Shepard mentions Myers' pronouncement<sup>4</sup> on "the necessity of applying the recognized principles of contagious disease control to tuberculosis." Myers has cited many preventable tragedies, particularly among nurses and medical students due to the neglect of well known methods of disease control. He believes that "tuberculous infection is decreasing decidedly, some rural communities showing less than 30 per cent positive reactors among their young." He believes further that "this reduction in the incident of tuberculous infection is progressive and the natural result of elimination of tuberculous milk-cows, and extensive isolation of the tuberculous human being." This, of course, places the problem largely in the hands of the epidemiologist and the clinician; although other social and economic factors may contribute to its solution.

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# PUBLIC HEALTH NURSING\*

A FEW GLEANINGS FROM THE RECENT ANNUAL MEETING OF THE AMERICAN  
PUBLIC HEALTH ASSOCIATION, HELD IN WASHINGTON, D. C.  
(FROM A PUBLIC HEALTH NURSE'S NOTEBOOK)

## *School Health*

In a recent study by Dr. Franzen of the American Child Health Association, only 50 per cent of children 7 or more per cent underweight were actually malnourished. This is only a little worse than bare chance.

Out of 100 cases of malnourishment only 4 were detected by the teacher. Height-weight tables detect only 12 per cent of the malnourished.

Teachers were only 13 per cent efficient in detecting dental defects, and only 15 per cent efficient in detecting severe vision defects.

The teacher's usefulness in school health work has not been exploited—her knowledge about the health of children needs to be used more by health workers. Where the school nurse has discussed a child with his teacher beforehand her home visit is much more effective. Closer coöperation between teacher and nurse improves school health work.

Dr. Phair of Toronto found in an extensive survey that the school nursing staff did not materially aid the control of communicable disease in a community, and that school health services in which public health nurses worked alone appeared to be just as effective as when the services were headed up by school physicians.

## *Child Welfare*

Dr. Phair, in his survey, found that few of the agencies carrying on child hygiene work kept good records. Their ideas of the purposes of their service

were vague; the medical and health services were not intimate enough. For the most part, the measurement of the efficiency of the child hygiene program was the number of children attending the well baby clinics. No one knew how many babies under 11 months were regularly consulting their family physicians.

## *Tuberculosis*

Dr. Atwater of Cattaraugus County found only 1 case of manifest tuberculosis among 1,308 rural children. He recommends for a tuberculosis program in a rural area the examination of contacts of diagnosed cases and the routine examination of high school students, preferably seniors.

Violet Hodgson, R.N., said the major step for the public health nurse was the finding of adult tuberculosis cases, and one good measurement of her effectiveness was her ability to get good case histories.

Dr. Winslow of New Haven said that 40 years ago practically everyone had been infected with tuberculosis and the physiological or personal hygiene attack was necessary to help one keep up his resistance. Now since it is found that in rural communities, at least, everyone has not yet got the tuberculosis germ, the bacteriological emphasis needs to be put on tuberculosis control, that is, the prevention of the spread of the disease.

E. F. M.

WHEN PUBLIC HEALTH NURSES  
WRITE PAPERS

Sitting through a season of innumerable annual meetings of various health

\* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

and nursing organizations at which public health nurses have read papers, puts one in a position to make some observations on these papers and their failure or effectiveness in creating the interested attention of the listeners.

There are four kinds of writing—descriptive, narrative, argument, and exposition. "Entertainment is primarily the aim of narration and description; instruction is the main purpose of argument and exposition." Most professional papers are expository—they explain something—they impartially unfold a generalization to the understanding of the listener.

On its structural side a successful paper is dependent upon careful selection and clear arrangement of material and adequate amplification. It is usually on this last feature that public health nurses fall down in their papers.

The most important method of amplification in expository writing is *reducing generals to particulars*.

Exposition deals largely with the abstract and the general. The full meaning of the general and the abstract is usually not clear, and clearness is the *sine qua non* of expository writing. Hence the writer must take pains to avoid excessive abstraction by giving the specific details upon which his generalizations are based. General facts must be amplified by enumeration of particulars enough to make conclusive ground for the assertion of it; general principles must be amplified by instances and examples in order to make clear the character of them. It is a good rule for expository writing, and one that the young writer will do well to adopt literally, to follow every general statement with particulars and details, with specific examples or concrete illustrations, or comparisons and analogies with what is known and familiar. "Abstractions produce very little or no effect until translated into concrete," says Lamont. "If the writer does not translate them the reader must; and this task makes hard reading." Concreteness, therefore, is very important in expository writing, both for clearness and interest.

Public health nurses can draw from such a wealth of interesting incidences

in their experience that they never should have any difficulty in backing up any generalization with a concrete illustration. A public health nurse who had been particularly effective in assisting the state sanitary engineer to get people in her county to see the need of a sewage plant and sanitary privies in her county seat and several other towns in her county which had been having a consistently high typhoid fever morbidity and mortality rate, was asked to be on a state health officers' annual meeting program to tell how she did it. Instead of giving concrete incidences of problems she encountered and overcame, she spent the whole time telling what she would do if she ever started over in a new county—how she would work with the medical profession, develop group leadership among various clubs, etc. Not one point that was made could be remembered from her paper. She lost a valuable opportunity and actually bored her listeners.

Elma Rood, of Detroit, who read a paper on "The Part the Laity Plays in a Rural Child Health Program" at the recent American Public Health Association Meeting in Washington, D. C., illustrated this point on the positive side. Toward the end of her paper she told about Pumpkin Creek's loan closet, how the children in Sleepy Hollow were transported to the dental clinic at a neighboring center, how the preschool children with the mothers were given a "party" at an isolated rural school, and while there were given complete physical examinations. Long after the generalities in this paper are forgotten those who heard it will remember these concrete examples of effectiveness of the child health program—and they will remember the general principles involved by deductions from them.

Public health nurses are not the only ones who fail in amplification, but that's another story.—Maurice A. Fulton, *Expository Writing*, Macmillan Co.,

1926, pp. XIII, XV, XVII, XX, XXVII, XXXIV; Elma Rood, Participation of Lay People in the Promotion of a Rural Child Health Program, *A.J.P.H.*, XXII, 10:1030-1032 (Oct.), 1932.

E. F. M.

#### NURSE FELLOWS OF THE A.P.H.A.

Public health nurses have often been criticized for taking too narrow a view of public health, of thinking their own contributions to a community paramount, to the exclusion of all the other public health workers. They are closely allied with the whole nursing group through membership in district and state nursing associations and in the American Nurses' Association; they are members (we hope) of their special group, the National Organization for Public Health Nursing, but these affiliations are not enough. Public health nurses need to be tied up in some way with the broader field of public health of which they are only a part, by membership in the American Public Health Association, the oldest unofficial public health organization in America. This Association has 9 active sections besides that on Public Health Nursing, and reading the official magazine of the Association and attendance at its annual meeting offer unparalleled opportunities to a public health nurse to get a broad perspective of the whole field of public health.

Since the objective of the public health nurse is "the satisfactory adaptation of the individual to an environ-

ment that makes health possible" how can she do without the contributions of the different sections of the A.P.H.A.—Health Officers, Laboratory, Vital Statistics, Public Health Engineering, Industrial Hygiene, Food and Nutrition, Child Hygiene, Epidemiology, and Public Health Education? She needs to belong to the Public Health Nursing Section of this organization to insure the integration of public health nursing with these other branches of public health.

There are already around 500 nurse members of the A.P.H.A. Public Health Nursing Section, and out of some 15,000 public health nurses in this country there should be more. However, there are very few Fellows in the Public Health Nursing Section. Public health nurse executives who are all more or less responsible for staff education programs should all be Fellows. The section officers must be Fellows, and how can they be truly representative of the best in public health nursing in this country if there is a meager number of Fellows to choose from? Only a Fellow, too, can cast a vote at the annual meeting, and that means something if public health nursing is to take its place as part of a general public health program. Write to the American Public Health Association, 450 Seventh Avenue, New York, for membership or fellowship blanks.

Those in the Section who are already Fellows would do well to think about a Life Membership.

E. F. M.

## EDUCATION AND PUBLICITY\*

**The Health Education Institute—**The first response to the announcement was a surprise to all concerned. The number and the representative character of those enrolled gave evidence of a high grade personnel engaged in health education activities. We now *know* that the most experienced of the workers have that will to learn.

Extracts from the factual material will be given in this department in future issues.

**A Question of Ventilation—**Does the practicability of ventilation need ventilating?

Can health educators make much progress without attention being given to methods for control of heating and ventilating homes, offices and meeting places?

What is the use of talking about 68° when so many people are uncomfortably cold at that temperature?

Have any of the fresh-air workers thought out the practical problems and how to meet them?

This year a lot of people will not be over-heated in their homes. Can we help meet that set of practical problems by offering truly practical advice?

**Education as It Is—**Education of the individual grows out of contacts with people and things, with ideas and information.

Some of it is planned and directed, but much of it is casual and incidental to life.

In the Health Education Institute we were concerned with what touches young people and adults apart from the

sharply defined and specific group found in a high school or college class.

Sometimes we teach under conditions similar to those of the classroom when we can carry out a course of study or other health project in a club, factory, etc.

**It's a Long, Long Trail—**In a letter received by the North Carolina Board of Health, a nurse

. . . describing the insanitary condition and actual danger resulting therefrom in a number of the smaller schools in the section of the state she was at work in, she concluded with: "To tell the truth, the teachers are just beginning to understand sanitation. It is really the gradual process of education."

It is a knowledge of this fact and especially the fact that it takes a long time for the masses of the people to receive and absorb sound information on these questions that makes it so important at the present time that no ground be lost which has been attained toward this end.—

*Health Bulletin*, North Carolina Board of Health. Oct., 1932.

**Community Health Organization**—"Education of the public in the principles of healthful living and disease prevention is a most important function of the health department." These words introduce the chapter on "Popular Health Instruction" in *Community Health Organization*, the revised edition of the manual of administration and procedure for cities. In a dozen pages we have a concise summary of the essentials in program planning and execution which serves as a guide to a critical review of the present health education work of a department, as well as a framework for an adequate program.

A significant detail is the reminder

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Ewart G. Routzahn, 130 East 22d St., New York, N. Y.

that "an adequate popular health instruction service calls for a trained technician with a salary commensurate with the responsibility and training demanded."

We wish that more had been said about the position of leadership which the department should hold in cities where various agencies are doing health education, and how the department might effectively coördinate all local activities in this field with economy and increased effectiveness. The chapter on "Voluntary Health Service" has several paragraphs on this important subject.

Every staff member of a health department or a private health agency should read the entire book for the perspective of the whole field. The book is edited by Ira V. Hiscock, and published by Commonwealth Fund, New York. \$2.00.

**When Doctors Advertise**—"A preliminary review of recent advertising concerning medical service and public health, conducted by county medical societies, public health agencies, hospitals, clinics, and business organizations," is *Medical Advertising*, by Mary Ross, issued by Julius Rosenwald Fund, Chicago. 72 pages. Free.

"Advertising may be taken to mean the use of a certain amount of purchased space or time to inform the public as to something which the purchaser believes the public needs or may desire." Much interesting information is given about advertising experiments by medical and dental societies. Advertising in periodicals by a group of ethical business firms to emphasize the services of the medical profession is described.

The chapters devoted to public health agencies have almost nothing to do with "advertising" and less with paid advertising, except in the case of the Public Health Institute of Chicago and

the Life Extension Institute of New York. The picture of "advertising" is blurred by the inclusion of non-advertising forms of health education and publicity. A smaller pamphlet would have been more useful.

The reader of the report should bear in mind the wide difference between advertising to promote use of the services of physicians, and advertising for the promotion of health habits or maintenance of health agencies; and the different significance of paid space and of contributed advertising space in newspapers or magazines.

**A Use For Your Ideas**—Ideas for cartoons on public health can be passed on to some of the syndicates supplying cartoons to newspapers. Ideas for newspaper and magazine articles have a chance for hopeful consideration. Any form of factual or illustrative material which might be used by writers is earnestly requested.

Please send any of the above mentioned material to Paul Komora, National Committee for Mental Hygiene, 450 7th Ave., New York. Mr. Komora is chairman of the Health Section of the United Educational Program. This is the committee responsible for the public health numbers of the bulletin series, "Behind the Front Lines" mentioned elsewhere.

**"Fighting" For Health Department Budgets**—Depression effects on health department budgets were treated in a general session at the Washington meeting of the A.P.H.A. Several speakers referred mildly to the need of interpretation or explanation. A strong appeal was made for a "fighting" attitude toward budget cuts. One state health officer related his successful dealings with several political leaders. No one explained how to "fight" against budget cuts. No one suggested that it was more than a one-man job.



There was no indication that the maintenance of the health department is a community job, nor that the health officer might and should share with the citizenry the responsibility of meeting budget reductions.

What can be said for a health department? Almost anyone will grant that it is important, very important. Most people know about many of its activities. But what can be said in favor of its budget, even in normal times? What ideas or arguments can be offered? What evidences of its value can be offered?

How can the community be led to accept responsibility for health department maintenance? What particular groups should be cultivated and informed? What is desirable and practicable in the way of a council, committee, or other organization relationships?

The recreation and character-building agencies faced a similar problem last winter. A committee was formed by the Social Work Publicity Council. This committee and several subcommittees did some hard work. They dug into their philosophies and their publicity in search of what they had a right to claim would be convincing. They analyzed doubts and objections and stated their answers. They searched for the best statements made by various authorities.

They put this material into form for a meeting last spring, and then issued a pamphlet for wide use by those who are raising funds and explaining work for young people to local communities.

Should we do something similar for public health?

**How Do You Use Them?**—The series of bulletins of material for producing publicity, "Behind the Front Lines," has gone to all community chests. Some national agencies have

sent their special bulletin to locals in their field. Ask your national, or send 10 cents for single copies, \$1.00 for the series, to Association of Community Chests and Councils, 420 Lexington Ave., New York. Titles: Public Health Nursing, Tuberculosis, Hospitals, Nutrition, Child Health, Social Hygiene, Mental Hygiene, Recreation and Character Building, Transients, Social Case Work, Emergency Relief, Protective Measures for Children.

How have you, or the chest, or any other agency used any of the material in those bulletins? Please send samples. Please also send suggestions for preparing better material for local use.

**All Should Know the Facts—**  
Says Dr. John Sundwall, University of Michigan:

In addition to specialists in adult and child health education, all public health work must be permeated with the idea, function, scope, and importance of public health education. Today it is just as important for all public health workers to have an appreciation for and a general working knowledge of public health education as it is for them to know about water filtration, sewage treatment, nutrition, mental hygiene, and related subjects.

Hence public health education not only requires experts, but it must become one of the working tools for all public health workers. Already attention has been called to the importance of adequate training, on the part of the public health educator, in those basic sciences which acquaint one with the structure, functions, and care of the human body. The first principle in all public health education is knowledge of the facts involved in the promotion of health and the prevention and control of communicable diseases. Far too much of our public health education of today includes opinions and empiricisms. This is due largely to our innate tendency to react emotionally toward our human make-ups, whether in order or out of order. What we feel to be a good health practice we are prone to pass along as a scientific dictum. Moreover, there is that emotional proclivity to adopt and follow the single-track mind in matters pertaining to

health. Hence fads and hobbies may permeate health practices and public health education.

The public health educator should and must know the facts—not only the established facts, but also the new facts which are contributed almost daily through research and investigation. The second principle in health education is to know how to present these facts to the public—adult and child—and to present them.—

In "Public Health Education: The Functions of the University and the Private Foundation." *Public Health Reports*, Washington. Oct. 7, 1932.

Includes, what the university does; "The Functions of Nonofficial Health Agencies"; "Official Versus Nonofficial Health Agencies." All good for all of us to read all of it.

#### MOTION PICTURES

Health Officer Frank Osborne, East Orange, N. J., with the active collaboration of two board members has a motion picture presentation of the department activities. On narrow film this picture was quite inexpensive to produce and promises wide usefulness. An extensive schedule of local showings has been worked out.

At Washington the Metropolitan Life Insurance Company presented a new talking picture which will be described next month.

*The American Journal of Cancer* is offering, without cost, a series of motion picture films on cancer for showing before medical groups. The films now ready for distribution are "Cancer of the Skin," based on material gathered by Dr. Joseph Colt Bloodgood and Dr. Charles F. Gerschicter of Johns Hopkins Hospital, and one

showing "Technical Methods of Cancer Research," taken at the Institute of Cancer Research, Columbia University. The films are obtainable in either 16 or 35mm widths, and are adequately titled so that no explanation is required while they are being shown. They are available for use in the United States only. Full information concerning the films can be obtained from the Motion Picture Department, *American Journal of Cancer*, 1145 Amsterdam Ave., New York, N. Y.

#### DEPRESSION

"Observations on the Depression and Public Health," by Dr. D. B. Armstrong. Reprint from *Medical Journal and Record*. How depression does not affect public health, and how it does do so. *Free*. From Metropolitan Life Insurance Co., New York.

"Depression Death Rates." Editorial. *Journal of American Medical Association*, 535 N. Dearborn St., Chicago. Oct. 15, 1932. *Free* copy in Clip Sheet for Editors. A readable interpretation usable in many ways.

*Birmingham's Health*, Jefferson County Board of Health, Birmingham, Ala., had a cover-page cartoon supplied by the Health Education Service of the A.P.H.A. illustrating "depression economy" as "one more obstacle on an up-hill road." The Health Department is a big truck loaded with boxes and bundles representing "vital statistics," "education," "clinics," and so on. Big rocks in the road are "indifference," "carelessness," "ignorance," and "delay." Beyond the rocks the truck seems stalled in heavy ruts labeled "depression economy." Sept., 1932.

## BOOKS AND REPORTS

**Nurses on Horseback**—By *Ernest Poole*. New York: Macmillan, 1932. 168 pp. Price, \$2.50.

This is a very dramatic and interesting story of the organization and work of the Frontier Nursing Service in the mountains of Kentucky. The author writes from first hand observation, having made a visit to the centers, and field trips with the nurses, and held conversations with the mountaineers. It is a story of the organization by Mrs. Mary Breckenridge of the first nursing center in 1925, and how this has grown in seven years until, "in a small central hospital and 8 outlying stations in lonely regions of the hills unreached except by mountain trails, 28 nurses with 3 supervisors serve a region covering nearly 800 square miles, in the counties of Leslie, Perry, Clay, Bell, Harlan, Knox, and Owsley."

The nurses are all trained in midwifery and public health nursing. The midwifery work is probably their outstanding service, and is in itself a pioneering field in this country. "The care of mothers and babies, though it is still their main concern, almost inevitably leads to the care of the entire family." This care includes first aid, immunization, and general health instruction for adults, infants, and children.

If to some this writing seems to be over-sentimental we must remember that the general public, for whom the book is written, likes this type of presentation. It is in no way a professional study of the service. The book is full of human interest stories which give word pictures of the characteristics and environment of the "mountaineer." In reading one follows the "Nurses on Horseback" over rough mountain trails, day and night in all

kinds of weather. Interesting illustrations add completeness to the word pictures.

All who read will enjoy this book, and we hope it may help in interpreting to the public not only the work of the "new pioneers on old frontiers" of Kentucky, but the daily work of many public health nurses who are doing pioneer services in many localities and with many types of people, nurses whose work goes unpraised and often unappreciated.

FLORENCE E. SPAULDING

**Handbook of Bacteriology**. For Students and Practitioners of Medicine—By *Joseph W. Bigger, M.D.* 3rd ed. New York: Williams & Wilkins, 1932. 459 pp. Price, \$5.00.

The first issue of this book was January, 1925, since which two editions and one reprinting have been required. The book is one of the best of its class, well written and well expressed. A criticism that can be made is that it is too devoid of history. The organisms discussed have the name of the discoverer and the date of the discovery, but little or nothing more. The discovery of the anthrax bacillus is credited to Robert Koch in 1876, yet the organism was discovered in 1849, and in 1863 experimental infection with animals was done. It is also stated under Anthrax that the serum of Sclavo is the best. The author apparently has not heard of the improved serum developed by Eichhorn at the Bureau of Animal Industry in this country, which is considerably more potent than that recommended.

Under the head of immunity, the author has given very little space to Erlich's side chain theory for which he

expresses regret. We believe that his reasons for leaving it out are sound, though we miss it and still hold the opinion that for teaching purposes it has great value. The book is well printed and illustrated.

MAZŮCK P. RAVENEL

**Labor Problems and Labor Legislation**—By *John B. Andrews, Ph.D.* (4th ed.) New York: American Association for Labor Legislation, 1932. 135 pp. Price, cloth, \$.60; paper, \$.30.

This is the fourth revised edition of a standard treatise on labor legislation. In addition to cogent material on wages, hours of labor, collective bargaining, social insurance, and law enforcement, it sets forth guiding principles to make industry reasonably safe from accidents, and workers free from preventable diseases. The book is well printed, but has no index, and some of the many illustrations seem to have been inherited from earlier editions, in fact, from very early ones. Sanitarians interested in industrial hygiene and the prevention of occupational diseases will find this booklet of interest. JAMES A. TOBEY

**Hygiene, A Textbook for College Students**—By *Florence L. Meredith, M.D.* Philadelphia: Blakiston, 1932. 802 pp. Price, \$3.50.

This book is designed as a textbook in hygiene for students of the college level. It is the second edition, which has been revised and the contents rearranged.

The text is divided into 5 parts: Part I, on the need of teaching hygiene to students of the college level; Part II, devoted to human anatomy and physiology; Part III, pathological conditions; Part IV, the various phases of personal hygiene and Part V, the discussion of mental hygiene.

Part II devotes 160 pages to anatomy and physiology. While some basic

scientific information is necessary as a foundation for teaching health, there is some question whether any such proportion of a college course in hygiene, where the major aim is that the students may understand and practice healthful living, should be given to these subjects. Over 90 pages (Part III) are devoted to discussion of disease conditions.

The bibliography is placed at the end of the book. This would be more likely to be used if placed at the end of each chapter.

Some would question the desirability of segregating anatomical, physiological, and pathological material in definite large sections in the text. A more intimate nearness of the discussion of normal conditions, and of the pathological results of errors of living, to the discussion of the prevention and cure of faulty health by right living, would seem a more interesting and usable arrangement.

Of the 802 pages of the main text, a little over one-half are devoted to the discussion of various problems of hygiene and right living.

In spite of the heavy emphasis on technical anatomy, physiology, and pathology, this is one of the few good texts on hygiene, planned for the college level. Those considering the adoption of a college-level textbook in hygiene should give this work serious consideration. CHARLES H. KEENE

**House Design, Construction and Equipment, The President's Conference on Home Building and Home Ownership.** Washington, D. C. Price, \$1.15.

This volume, published as a result of the President's Conference on Home Building and Home Ownership, covers the design, construction, and fundamental equipment of the home. The problems of the designer are to distinguish essentials from nonessentials,

to plan efficiently for the most economical use of materials, and to make the small homes attractive in their mass as well as in proportions and detail. In these problems the designer needs the coöperation and help of the builders, contractors and the manufacturers of material and equipment.

The Committee on Construction emphasized the necessity for more widespread use of the best building practices; helps to protect the home buying public against "jerry" building; and the need for search and research for new and better materials and methods. Fundamental equipment in homes of today is superior to that in those built in the past. Devices for heating, lighting, plumbing, refrigeration, and ventilation have undergone remarkable developments in the past few years. The Committee on Fundamental Equipment considered standards, location, and installation of such equipment. Its report brings together a summary of information of great use to every builder, owner, or renter, and throws light on relative values and best uses for equipment now on the market.

ARTHUR P. MILLER

**Negro Housing.** The President's Conference on Home Building and Home Ownership. Washington, D. C., 1932. *A Report of the Committee on Negro Housing. Prepared by Charles S. Johnson.* 271 pp. Price, \$1.15.

Public health opinion tends more toward considering environmental factors as being responsible for the high morbidity and mortality rates among negroes than toward the view of the existence of some peculiar racial susceptibility on the part of these people. Important among these causes is that of the widespread poor housing that affects negroes in both rural and urban centers.

The problem of housing among

negroes is complicated by that of race relations. Indeed there are few if any situations of community adjustment involving this race which are not profoundly influenced by inter-racial complexities. This makes necessary the provisions for special studies in reference to the negro if a comprehensive conception of his problems and their connections with those of other racial groups is to be secured. Recognizing this fact the President's Conference on Home Building and Home Ownership set up a committee to make special investigations and analysis of the status of negro housing. The results presented in this volume are a synthesis of facts and their influence entering into this situation. The treatment is candid, broad in conception, and informative. It marks an advancement toward a better understanding of a difficult social condition. The presentation should be of value to public health workers despite the brevity of treatment of the health of the negro and his housing (page 57). The health inferences that may be drawn from the facts are bound to impress those interested in public health.

FRANKLIN O. NICHOLS

**Growth and Development of the Child—Part III—Nutrition.** A publication of the White House Conference on Child Health and Protection. New York: Century, 1932. 532 pp. Price, \$4.00.

This book is one of the four volumes prepared by the Committee on Growth and Development of the White House Conference on Child Health and Protection. The main object of the committee was to appraise the existing knowledge of growth and development of children from conception to maturity. The present volume is an exhaustive consideration of our present-day knowledge of nutrition in relation to growth and development. The thoroughness of the investigations

which form the basis of this volume is attested by the character of the investigators who presented various phases of the subject. It is really a compendium of our present knowledge and investigations of practically every phase of nutrition. The chapter on "Optimal Growth and Nutrition" corrects many erroneous views which have been held since height and weight standards have been used extensively in the schools. Each chapter is followed by a list of up-to-date references.

RICHARD A. BOLT

*The Crisis in Hospital Finance—By Michael M. Davis and C. Rufus Rorem. Chicago: University of Chicago Press, 1932. 241 pp. Price, \$2.50.*

One might cavil at the title though hardly at the contents of this timely review of the economic progress of voluntary general hospitals towards bankruptcy. We see the progress of long time policies leading to the apex of a dilemma, the solution of which involves a lot of rationalization, hard thinking, and close figuring by the holding corporations, commonly thought of as beneficent hospital trustees, by the necessitous public, that is, patients demanding instant attention, and by the physicians who serve on organized and courtesy staffs of hospitals.

There are no better documented authors on hospital economics, and the social implications of hospital costs and financial resources, nor any more widely familiar with the trends and tendencies in the conduct and support of hospitals in the United States than are Michael Davis and Rufus Rorem.

To those familiar with passing events as contributing public, the sick, and the doctor, hospital services, and what they cost, nothing of great novelty or originality appears in the twenty-one chapters of this book, but only particularly well informed and persistent

students of hospitalization problems will have been so fortunate as to have at hand and in logical sequence the excellent series of addresses and other documents here assembled on one theme.

The rapidly broadening reading public concerned seriously with correcting the errors of medical care and cost distributions, developed by the activities of the Committee on the Costs of Medical Care, will find much similarity between the facts and opinions here offered and the contents of many of the publications already issued by the committee.

After a description of the general situation which includes a summary of hospital facilities, capital investment, percentage bed use, and cost of maintenance of the hospitals of the United States, we are carried with generous but not elaborate tables and discussion through the economics of hospital care, the more pressing problems of hospital finance, of the depression era in particular, and finally to a somewhat philosophical consideration of the issues at stake and the experiments already under way toward solution.

Community Chest executives as well as hospital boards and county medical societies will find this book indispensable as a source of authentic information and sound policy, to say nothing of hospital superintendents, accountants, and public health councils and relief agencies.

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tion is growing that the main key to the prevention of maternal and early infant mortality rests in the hands of the well-trained obstetrician and midwife. This report considers every contingent phase of the subject and gives, in clear-cut recommendations, the steps which should be taken to improve obstetric education in this country. The parts on obstetric education of nurses and attendants, and on education of midwives should receive careful consideration. The education of the laity and social workers has been given special attention. The arrangement of the book is well fitted for reference purposes.

RICHARD A. BOLT

**Preventive Medicine**—By Mark F. Boyd, M.D. 4th ed. Philadelphia: Saunders, 1932. 532 pp. Price, \$4.50.

The fourth edition of this book, which is reset, proves that it has made a place for itself with teachers and those interested in public health. It has been brought up to date in almost all respects, though we fail to find any reference to psittacosis, which has become a public health problem in this country. The chief changes have been in the sections on milk supplies, water, and sewage disposal.

The book is well printed and abundantly illustrated, and will doubtless continue to hold the place it has won and occupied for 12 years.

MAZŮCK P. RAVENEL

**Sanitation Manual for Ice Cream Plants**—Prepared by the Research Committee of the International Assn. of Ice Cream Manufacturers, Harrisburg, Pa. *Special Bulletin No. 38*. 120 pp. Price, \$1.00.

Health departments have always placed particular stress upon regulation and sanitary control of milk and cream supplies. Milk products have received secondary consideration, and this has

been more or less true of ice cream. The results of this attitude have been exactly what would be expected, *i.e.*, that the milk industry has been educated to a high degree in the science of sanitation as applied to the food industry while the ice cream industry has not had the same advantages.

With an apparent realization of the situation the ice cream industry has, through the International Association of Ice Cream Manufacturers, done a laudable piece of work in the preparation and publication of two pamphlets designated as *Special Bulletin No. 21, Sanitary Regulations for Ice Cream*, and *Special Bulletin No. 38, Sanitation Manual for Ice Cream Plants*.

*Bulletin No. 21* was prepared in December, 1929, by the Committees on Sanitary Control of Ice Cream of the International Association of Dairy and Milk Inspectors and the International Association of Ice Cream Manufacturers. It was intended "for use of regulatory officials in the preparation of laws governing the manufacture and sale of ice cream and similar frozen foods, and as a guide to manufacturers in the operation of ice cream plants." The bulletin contains definite requirements in the form of a 10-section law and covers essential factors such as definitions; permits; premises; equipment; cleaning equipment; canning and packing ice cream; containers, packers, etc.; ingredients; pasteurization; and personnel; and also sanitary regulations for dealers and vendors of ice cream.

*Bulletin No. 38* was prepared by the Research Committee of the International Association of Ice Cream Manufacturers. The purpose of this *Sanitation Manual* is to assist ice cream plant operators to conduct their plant operations so as to comply with the terms of the sanitary code contained in *Bulletin No. 21*, and also to assist regulatory officials in their work. For the purpose of inspection record a "yes"

and "no" appraisal form is contained in the manual. The manual contains all of the provisions of the sanitary code and in many cases specific directions for carrying them out.

Food control officials interested in the sanitary control of ice cream supplies can gain much useful information from these bulletins and will find them essential in their work. Copies of the bulletins may be secured free by public health officials by communicating with Robert C. Hibben, Executive Secretary, International Association of Ice Cream Manufacturers, Harrisburg, Pa.

WILLIAM B. PALMER

**Emergency Work Relief**—By Joanna C. Colcord, Assisted by William C. Coplovitz and Russell H. Kurtz, Russell Sage Foundation, New York, 1932. 286 pp. Price, \$1.50.

This volume deals primarily with methods of administering work relief, and offers suggestions for those who are faced with the problem. Material for this study was collected from 26 American cities during the summer and early autumn of 1931 in response to a request from the President's Organization on Unemployment Relief. It was the aim to select projects in communities both large and small, conducted under a variety of auspices, public and private, and attended with varying success.

The book is divided into three parts, the last part perhaps containing the most constructive suggestions for community action. Part I deals with the development of work relief. Here are described legislative factors and methods of administration in the past. In at least 14 of the 26 programs described, the workers were protected by compensation insurance. In Grand Rapids, Milwaukee, and Niagara Falls, a medical examination was given before men were assigned to work.

Part II deals individually with reports on work relief in 26 communities.

From these reports, one is struck with the diversity of the inception, development, and conduct of work relief in the cities studied. Part III discusses the concepts underlying work relief and suggests methods of setting up a program. Several departments of municipal administration, as well as persons engaged in problems of relief and social service, will find much of interest in this timely volume.

IRA V. HISCOCK

**The School Health Program.** A publication of the White House Conference on Child Health and Protection. New York: Century, 1932. 400 pp. Price, \$2.75.

The report on *The School Health Program* is the most voluminous which has arisen from the White House Conference. It opens with a statement of the philosophy of education prepared by Professor William H. Kilpatrick. This is followed by a series of summarized reports of 24 sub-committees dealing with such subjects as the present school health activities; the school plant; mental hygiene; medical, dental, and nursing services; nutrition work in the schools; various phases of health education as applied to the elementary and secondary schools; social hygiene; physical education; etc. Special attention is given to problems of health in rural, negro, and Indian schools. A program of health for the parochial schools also is outlined. Due attention is given to the professional education of teachers and leaders in health education; and the importance of health service in teacher training institutions is stressed.

Under the able chairmanship of Dr. Thomas D. Wood, we have presented here a most comprehensive summary of the extent and diversity of school health problems. A composite review of many phases of the health and protection of school children is brought out by the

reports of various members of the subcommittees. This report forms a very useful background against which every progressive school system should check its actual accomplishments.

RICHARD A. BOLT

**The Modern American Family—**  
*Donald Young, Editor. Annals of the American Academy of Political and Social Science. Vol. 160. Philadelphia, 1932. 256 pp. Price, \$2.50.*

The student of the social and economic status of the family and its interrelations as the basic institution of modern society will find many valuable discussions collected in this volume. The papers edited by Donald Young, Ph.D., assistant professor of the Department of Sociology of the Uni-

versity of Pennsylvania, have been contributed by outstanding sociologists, psychologists, statisticians, specialists in welfare work, and clinicians.

The papers have been classified under three headings: The Heritage of the Modern Family, The American Family in Transition, and Efforts at Family Stabilization. Several of them touch upon the public health aspects of modern family life and the remedial agencies that have been established for improving the standard of American family life.

This book is especially valuable to the student of sociology and to welfare workers. It is well arranged, contains a helpful book department and index to subjects and names.

A. B. TOWSE

## BOOKS RECEIVED

**A CENTURY OF PUBLIC HEALTH IN BRITAIN, 1832-1929.** By Harley Williams. New York: Macmillan, 1932. 314 pp. Price, \$2.50.

**APPLIED BACTERIOLOGY.** By Thurman B. Rice. New York: Macmillan, 1932. 276 pp. Price, \$2.50.

**MY HEALTH HABITS. Book IV.** By Charlotte Townsend Whitcomb, John H. Beveridge and Evelyn Townsend McCrory. New York: Rand McNally, 1932. 249 pp. Price, \$.88.

**HEALTH STUDIES.** By F. M. Gregg and Hugh Grant Rowell. Yonkers: World Book Co., 1932. Home and Community. 258 pp. Price, \$.76. Personal Health. 314 pp. Price, \$.84.

**THE NEW HEALTHY LIVING SERIES.** By C.-E. A. Winslow and Mary L. Hahn. New York: Merrill, 1932. The Game of Healthy Living. 216 pp. Price, \$.64. The Habits of Healthy Living. 218 pp. Price, \$.64. The Laws of Healthy Living. 249 pp. Price, \$.64. The Healthy Community. 266 pp. Price, \$.68.

**OUTWITTING OUR NERVES.** 2d ed. By Josephine A. Jackson and Helen M. Salisbury.

New York: Century, 1932. 420 pp. Price, \$2.50.

**LIFE'S ADVENTURE. THE STORY OF A VARIED CAREER.** By Elwood Worcester. New York: Scribner, 1932. 362 pp. Price, \$3.00.

**CHILD CARE TODAY.** By Bela Schick and William Rosenson. New York: Greenberg, 1932. 320 pp. Price, \$2.50.

**ETHICS IN NURSING.** By Gene Harrison. St. Louis: Mosby, 1932. 163 pp. Price, \$1.50.

**CULTIVATING THE CHILD'S APPETITE.** 2d ed. By Charles Anderson Aldrich. New York: Macmillan, 1932. 137 pp. Price, \$1.25.

**ALCOHOL AND MAN.** Editor, Haven Emerson. New York: Macmillan, 1932. 451 pp. Price, \$3.50.

**YOUR HEARING. HOW TO PRESERVE AND AID IT.** By Wendell C. Phillips and Hugh Grant Rowell. New York: Appleton, 1932. 232 pp. Price, \$2.00.

**BACTERIOLOGY FOR NURSES.** 4th ed. By Mary Elizabeth Morse and Martin Frobisher. Philadelphia: Saunders, 1932. 409 pp. Price, \$2.50.

**THE MICROBIOLOGY OF FOODS.** By Fred Wilbur Tanner. Champaign: Twin City Printing Co., 1932. 768 pp. Price, \$7.50.

## A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Childhood Tuberculosis** — The author feels that the proper handling of tuberculosis in children requires a separate clinic adequately and competently staffed, and that the problem must be dealt with from the family angle. One more perfect example of beautiful printing which every health worker should take to heart.

BARNARD, M. W. A Tuberculosis Service for Children. Millbank Quart. Bull. 10, 4:257 (Oct.), 1932.

**Syphilis Control Through Treatment**—What it costs to treat syphilis in the hands of the general practitioner and at the pay clinic, and the relation of this cost to the ordinary patient's ability to pay, is set forth as an important factor in the spread of the disease because of the insufficient treatment many patients receive.

BROMBERG, L. and DAVIS, M. M. The Cost of Treating Syphilis. J. Soc. Hyg., 18, 7:365 (Oct.), 1932.

**Experimental Meningitis**—Meningococcus antitoxin injected after monkeys had developed critical symptoms following intraspinal inoculation with live meningococci protected the animals from acute cerebrospinal meningitis. Monkeys thus immunized were resistant to later lethal doses of organisms.

FERRY, N. S. Meningococcus Antitoxin. J. Immunol. 23, 4:325 (Oct.), 1932.

**Experimental Poliomyelitis**—Virus passed through monkeys intensifies its infectivity and undergoes quantitative changes. Virus-serum immunity is practical but the optimum protection is yet to be determined. Monkeys refractory to nasal infection are susceptible to intracerebral inoculation.

FLEXNER, S. Immunity to Human and Passage Poliomyelitis. J.A.M.A. 99, 15:1244 (Oct. 8), 1932.

**Nursing Motion Pictures**—Nursing technic, both for private duty and public health nurses, is the subject of a series of motion pictures used for nurse training. The idea might profitably be put to the training of inspectors and other health workers.

GOODRICH, A. M. The Nursing Procedure Motion Picture. Am. J. Nurs. 32, 10:1029 (Oct.), 1932.

**Colds and Diet**—Will ultra-violet light, irradiated ergosterol, cod liver oil, really increase immunity to colds as the enthusiasts would have us think? Not generally in infants, says this author. Neither are respiratory infections frequently due to a lack of vitamin A. But a lack of vitamin C may heighten local susceptibility in the respiratory tract. There's meat in this paper.

Hess, A. F. Diet, Nutrition, and Infection. New Eng. J. Med. 207, 15:638 (Oct. 13), 1932.

**High School Health Education**—Demonstrations of health education as conducted in some Massachusetts high schools are described briefly and possibly too modestly.

KIERNAN, F. Health Education Demonstrations in Massachusetts High Schools. New Eng. J. Med. 207, 14:604 (Oct. 6), 1932.

**Prenatal Clinic Results**—This report upon 218 complete clinic cases leads to some interesting conclusions. Too many made too few visits; the routine Wassermann proved its worth; and the value of physical examination was demonstrated. There was but 1 maternal death but the neonatal deaths were high.

NICOLL, M., JR. and MARSH, E. H. Report of Two Hundred and Eighteen Completed Cases Seen at the Westchester County Prenatal Clinic in 1931. New York State J. Med. 32, 20:1180 (Oct. 15), 1932.

**Possibilities of Mosquitoes Transmitting Tularemia**—"It is likely that suitable conditions to effect such transfers in nature are rare, and it is probable that at most only infrequent infection of man would occur in this manner." So concludes a demonstration of the possibility of the mechanical transmission of tularemia by mosquitoes.

PHILIP, C. B., *et al.* Experimental Transmission of Tularemia by Mosquitoes. Pub. Health Rep. 47, 43:2077 (Oct. 21), 1932.

**Rural Nursing**—Perhaps you are too hard headed to be influenced by perfect printing and appealing pictures. This story of public health nursing in Cattaraugus County seems so utterly convincing that this reviewer, for one, begins to suspect his own judgment. Perhaps he is only charmed by the printed page, so you had best read it yourself to form your own conclusion.

RANDALL, M. G. Public Health Nursing Service for Rural Children. Millbank Quart. Bull. 10, 4:276 (Oct.), 1932.

**Immunization Problems**—Limitations of artificial immunization and the desirable factors in the various procedures are set forth in stimulating generalities which introduced a British discussion of these subjects.

STALLYPASS, C. O. Problems of Immunization in Public Health. J. State Med. 40, 10:573 (Oct.), 1932.

**More Bacteriological Dissociation**—Dysentery type III bacilli develop

rough and smooth variants, the R type being the standard for cultures used in making antiserums. But it is the S type, not the R, that appears to be resistant to the serum. This is the cause of experimental errors, conclude the authors.

THIJOTA, T. and WAALLEP, E. Dissociation and Sensitiveness to Normal Serum in Dysentery Bacilli of Type III. J. Bact. 24, 4:301 (Oct.), 1932.

**Mental Reactions to the Depression**—The effect of adversity upon frank mental pathological states is measured statistically, whereas the more significant end-results can only be surmised.

THOM, D. A. Mental Hygiene and the Depression. Mental Hyg. 16, 4:564 (Oct.), 1932.

**Bacteriologic Tests of Water**—Only *B. coli* type colonies in a ferro-cyanide citrate agar medium are indicative of fecal pollution; *B. acrogenes* type and intermediate type colonies should not be considered dangerous; so concludes the author of this study.

TONNEY, F. O. and NOBLE, R. E. Colon-Acrogenes Types of Bacteria as Criteria of Fecal Pollution. J. Am. W. W. Assn. 24, 9:1267 (Sept.), 1932.

**Water-Borne Typhoid**—Causes of outbreaks of water-borne typhoid fever epidemics are set forth in interesting detail.

WOLPERT, N. N. B Typhosis is Waiting for You. Water Works Eng. 85, 19:1122 (Sept 21), 1932.

# NEWS FROM THE FIELD

## DELTA OMEGA HONORARY PUBLIC HEALTH SOCIETY

THE annual meeting of Delta Omega, the Honorary Public Health Society, was held in Washington, October 25, 1932, with the largest attendance in the history of the organization, including three honorary members, Colonel F. F. Russell of the Rockefeller Foundation, Dr. S. Josephine Baker, and Dr. M. P. Ravenel, editor of the *American Journal of Public Health*, and also General M. A. DeLaney, Acting Surgeon General of the U. S. Army.

Officers elected were: *President*, Dr. A. W. Freeman, Professor of Public Health Administration, Johns Hopkins University; *Vice-President*, Professor Ira V. Hiscock, Yale School of Medicine, and *Secretary-Treasurer*, Dr. W. G. Smillie, Professor of Public Health, Harvard University. Dr. James A. Tobey of the Massachusetts Institute of Technology Chapter was the retiring President.

Among other activities, the society, with the coöperation of the American Public Health Association, has republished Budd's classic work on typhoid fever, and this may be obtained by anyone interested, at a nominal cost, from the American Public Health Association, 450 Seventh Avenue, New York.

## DEATH OF DR. MONGER

DR. John Emerson Monger, F.A.P.H.A., died in Columbus, O., October 28. He knew more people in the public health profession than any other one man, and probably had more intimate personal friends than any other health officer. He was a most generous man with his time, his money, and his information. There have been many

stories of gameness in the arena, but never has there been a more perfect demonstration of sportsmanship than this man's life for the past four years. Beset with a chronic ailment which might terminate fatally at any moment, he never faltered in his attempt to improve the public health work of this country.

Dr. Monger was State Registrar of Vital Statistics for the State of Ohio 1916-1920, and Director of Health of Ohio 1923-1929. He was a member of the A.P.H.A. since 1923 and a Fellow since 1926. At the Washington Annual Meeting he was elected an Honorary Member of the Association. C. C. Y.

## NATIONAL REHABILITATION ASSOCIATION

THE National Rehabilitation Association, which is devoted to the promotion of vocational restoration of the disabled, determined at its convention in Chicago, October 10-12, to carry on an extensive campaign to place the need for the restoration of the handicapped before the people of the country.

The Association selected as Director John A. Lapp, of Chicago, formerly President of the National Conference of Social Work. Officers are: *President*, Oscar M. Sullivan; *Vice-President*, H. D. Hicker; *Secretary*, Homer W. Nichols; *Treasurer*, LeRoy N. Koonz.

## MICHIGAN WATER PURIFICATION CONFERENCE

THE Seventh Michigan Conference on Water Purification was held at Mt. Clemens October 5-7. The conference was unusual in that prepared papers were few and the members were given an opportunity for free discussion of plant problems at every session. This created an informal atmosphere

which caused many who would otherwise be inclined to refrain from comment to enter the discussion and was a condition commented upon by many who never attended before.

TEXAS ASSOCIATION CHANGES NAME

THE name of the Bexar County Public Health Association (San Antonio, Tex.) was changed by resolution of the Board of Directors at its regular meeting held in September to Bexar County Tuberculosis Association.

EXAMINATIONS OF CHILDREN

APPROXIMATELY 76,000 children entering school for the first time were examined under parent-teacher association direction in 1931. This number does not include many thousands of children of preschool age examined who did not enter school. It is anticipated by Summer Round-Up workers that the number of children examined this fall will exceed the number reported last year.

NEW YORK STATE SEWAGE WORKS ASSOCIATION

THE New York State Sewage Works Association held its Fall Meeting at Saranac Lake October 14-15, President Earle B. Phelps presiding. In the afternoon, after a brief business session, papers were presented by Henry W. Taylor; Ellis K. Phelps and Earle B. Phelps; and George Nesbit. The meeting unanimously adopted a resolution protesting against drastic or unproportionate reduction in maintenance funds for municipal sewage treatment works. The Fifth Annual Meeting of the Association will be held in New York City in the middle of January, 1933.

CAN WE REDUCE ACCIDENTAL DEATHS?

LAST year accidents of all kinds caused 4,634 deaths in the City of New York, 1,298 of these being charged

to automobiles. . . . It may be well to bear in mind that other accidents also deserve attention. Arranged in the order of frequency, and omitting accidental deaths due to machinery or to means of transportation, these other accidental deaths in New York City in 1931 were charged to the following causes:

Accidental falls and crushing.....	1,356
Drowning . . . . .	435
Illuminating gas . . . . .	305
Accidental burns.....	232
Acute poisoning.....	108
Gases other than illuminating....	70
Sunstroke . . . . .	66
Injuries from cutting or piercing instruments . . . . .	64
Conflagration . . . . .	59
Mechanical suffocation.....	31
Firearms . . . . .	18
Injuries inflicted by animals.....	7

Of the 435 deaths from drowning 409 were in males. With the great popularity of bathing among both sexes it is probable that the number of lives exposed was not much if any greater among males than among females. The former, however, are more reckless and pay the penalty. An examination of the drowning deaths by age fails to show much greater frequency of this accident at any particular age period. In other words, so far as this accident is concerned the male does not appear to acquire greater caution as he grows older. In fact the rate from drowning appears to be highest among males in the age period 35 to 50. It is not a tribute to man's common sense.

When we examine deaths from accidental burns we find they are more numerous among females, 102 males to 130 females. Moreover, a large proportion of these deaths occur in children under 5, namely, 25 males and 47 females. During the next 5 years they are also quite numerous, 11 males and 16 females, but after that they drop quickly to a low point between 15 and 25 years.

Except for accidental deaths due to automobile and street accidents and to accidents caused by machinery, there is little in the way of administrative measures that can be done to reduce these unnecessary deaths. Almost entirely is it a question of educating and training the individual. Perhaps our school teacher readers can utilize the material here presented to teach the lesson.—*Weekly Bull.*, City of New York, 22:35 (Sept. 3), 1932.

#### DEMAND FOR VACCINES INCREASE

THE demand for vaccines and other preventive material has increased enormously during the last three years in Illinois and the trend is still upward. Since January, 1929, fully one-half million children have been immunized against diphtheria with toxoid and toxin-antitoxin furnished by the State Department of Public Health compared with 300,000 during the previous four years. Over a quarter of a million people were vaccinated against smallpox with vaccine distributed by the department, compared with less than 75,000 during the preceding quadrennial. The number of people vaccinated against typhoid fever with material furnished by the department jumped from 60,000 to 75,000 in the two periods, respectively. To determine the susceptibility of children to diphtheria the department distributed material sufficient for 135,000 and 65,000 tests during the two periods, respectively. The results of this growing demand for preventive medicine are reflected in lower prevalence rates of the diseases subject to control by these methods.—*Illinois Health Messenger*, Nov. 15, 1932.

#### NORTH CAROLINA WATER WORKS ASSOCIATION

THE North Carolina Section of the American Water Works Association and the North Carolina Sewage Works Association held its Twelfth

Annual Joint Convention at Winston-Salem October 31, November 1-2.

#### RESIDENTIAL SANITATION

D R. R. H. Riley, Director of the Maryland State Department of Health, announces that the department has issued a pamphlet on residential sanitation, containing practical suggestions for solving the more important sanitary problems that affect the welfare of those living in rural homes.

A copy may be obtained by writing to the Bureau of Sanitary Engineering, Maryland State Department of Health, 2411 North Charles Street, Baltimore.

#### PRESERVATION OF FOOD BY DRIKOLD

IN England the government maintains a station at Cambridge where researches on low temperatures for the preservation of foods are carried out, and another station at Aberdeen, devoted to the preservation of fish. The use of solid carbon dioxide known in England as "drikold" and in this country as dry ice, has already revolutionized the methods for preservation heretofore in vogue. Dry ice is extensively used in the ice cream industry, and in the transportation of fish and other perishable foodstuffs. The researches in England have proved that meat and fish can be kept for long periods in perfect condition when stored in chambers the atmosphere of which has been displaced by carbon dioxide and which are maintained at definite low temperatures. The action of the cool carbon dioxide gas inhibits bacterial deterioration, and the meats do not suffer the deterioration caused by ordinary chilling or refrigeration. The report points out that at present meats from Argentina, Australia, and New Zealand have to be frozen to arrive in edible condition in England, but by the new process, this will not be necessary. Applied to fish, the process seems to hold even more important potentialities.



The great bulk of fish eaten in England is brought from as far north as Greenland and Murmansk, the southern waters not having been fished for this purpose on account of the impossibility of transporting the catch to England in edible condition. So far, practical methods of applying the discovery to trawlers, storage houses, railway cars, etc., have not been worked out in detail, but there seem to be no insurmountable difficulties in doing this.—*Med. Off.*, Sept. 10, 1932, p. 113.

#### CHILD HEALTH CENTER, ALBANIA

THE establishment of a child health center in Albania was the first step in a campaign against infant mortality. Because the methods of child care in the villages and even in the cities are very unsatisfactory the committee conducting the campaign decided to organize courses for mothers; these courses are well attended. In the capital, Tirana, courses for the training of midwives were organized, and some women were sent to France for post-graduate study.—*Maternità ed Infanzia*, Rome, Sept., 1932.

#### NEW PASTEURIZING PROCESS ILLEGAL IN ILLINOIS

A NEW development in pasteurizing equipment which is a modification of the old "flash" method has been the subject of research and study by various persons and organizations during the past few years.

This new method is known as "short time" pasteurization and consists of heating milk to a temperature of 162° F., and holding at that temperature for a period of 15 seconds.

The milk committee of the A.P.H.A. reported at the Montreal convention on studies and experiments with new type short time pasteurizers. The conclusion that may be drawn from this report is that "short time" pasteurization will produce safe milk from a public health

standpoint. Commercially it is said to have many advantages over the holding method now in use.

Some Illinois pasteurization plant owners are showing interest in the "short time" pasteurization method. However, Illinois law requires that milk or milk products be heated to a temperature of not less than 142° F., and held at such temperature for not less than 30 minutes. To permit the use of "short time" pasteurization in Illinois, it will be necessary to amend the existing law.

The New York State Department of Health and Pennsylvania Board of Health have approved "short time" pasteurization. Texas State Department of Health has indicated that "short time" pasteurization will be permitted in that state.—*Illinois Health Messenger*, Nov. 15, 1932.

#### PERSONALS

C. O. SAPPINGTON, M.D., DR.P.H., F.A.P.H.A., of Chicago, is now conducting a new service as consultant on problems of Medicine and Hygiene in Industry.

JOHN A. LAPP was elected Director of the National Rehabilitation Association at their convention in Chicago October 12.

DR. WILLIAM WALTER CORT, professor of helminthology and head of the department, School of Hygiene and Public Health, Johns Hopkins University, delivered the annual address of the Alpha Alpha chapter of Alpha Epsilon Delta, University of Alabama, on November 16, 1932. His subject was "The Hookworm Problem in the United States." Following the lecture, honorary membership in Alpha Epsilon Delta was conferred upon Dr. Cort.

#### DEATH

MORRIS KNOWLES, F.A.P.H.A., Sanitary Engineer of Morris Knowles, Inc., Pittsburgh, Pa., died November 8.

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## FOOD AND NUTRITION

The Vitamin A, B, C and G Content of Sultanina (Thompson Seedless) and Malaga Grapes and Two Brands of Commercial Grape Juice—Although the literature has reported raisins as containing little vitamin A, and small amounts of B and C, there is little published on the vitamin content of fresh grapes and grape juice. Thompson Seedless and Malaga grapes were the varieties studied and two types of commercial grape juice, (1) a mixture of Flame Tokay and Zinfandel, and (2) juice from Concord grapes. In both cases, the juice is pasteurized before putting on the market.

In the studies on grapes the basal diet was irradiated to supply vitamin D, and after depletion supplements of Malaga and Sultanina grapes were fed the rats. A small amount of vitamin A was indicated in the two varieties of grapes, but neither of the juices tested showed any indication of this vitamin. The animals died before completion of the experiments, and upon autopsy showed vitamin A deficiency.

The vitamin B (antineuritic) was tested on rats on a diet complete except for the antineuritic vitamin. After a 2-week period the supplements of grapes and grape juice were fed. Five and 6 gm. of the grapes produced the maximum effect of vitamin B, an average gain in weight of 17.5 gm. in the case of Malaga, and in the case of Sultanina an average of 18.8 gm. on 5 gm. of grapes, and 21.6 gm. on 6 gm. portions, showing the grapes are a fair source of the antineuritic vitamin. No measurable quantity of this vitamin could be found in the commercial juices studied.

The vitamin C tests on commercial

juice No. 1 were carried out according to the Sherman technic. The tests on the grapes and on the Concord grape juice were made according to the Höjer method. During the 18-day test periods, 10 and 12 c.c. portions of grape juice were fed to guinea pigs and the grapes in 2, 5, 10, and 15 gm. portions.

All of the teeth of the guinea pigs receiving Concord grape juice showed pathological conditions similar to the controls, indicating no appreciable amount of vitamin C. Two and 5 gm. portions of both varieties of grapes did not prevent the pathological changes in the teeth. Ten gm. of grapes showed slight protection but even 15 gm. was insufficient for borderline protection.

In the case of vitamin G, tests on young rats indicated a small amount of this vitamin in the Sultanina but the Malaga grapes and both commercial grape juices did not show evidence of this vitamin.—Esther Peterson Daniel and Hazel E. Munsell, *J. Agri. Res.*, 44: 59 (Jan. 1), 1932.

**The Amino Acid Deficiencies of Beef, Wheat, Corn, Oats, and Soy Beans for Growth in the White Rat**—Paired rats were used in the study of the amino acid deficiency of these foodstuffs and to determine which combinations of foods would be nutritionally advantageous. Rats were weighed weekly and at the termination of the experiment, lasting from 5 to 12 weeks, body lengths were determined, so as to compare differences in pair mates in body lengths and body weight.

Lean beef at the 8 per cent protein level showed an average of 1.89 gm. daily gain for controls and 2.09 gm. for those with the cystine supplement.

When fed at the 20 per cent protein level, greater daily gains averaging 2.78 gm. were noted, but added cystine resulted in no appreciable effect on growth.

Wheat at the 8 per cent protein level showed no increased growth with the cystine supplement but when lysine was substituted for the cystine the lysine-fed rats gained faster than the controls. With oats at the 8 per cent protein level, the lysine supplement showed 1.38 gm. daily gain against 1.30 for the controls. In the case of soy beans, cystine supplement showed greater gains than the controls and greater body lengths. Corn at the 8 per cent protein level was supplemented with lysine and then with tryptophane, the former showing a small effect. Tryptophane showed no supplementing effect at this protein level. Tryptophane added to a corn ration at the 8 per cent protein level, already supplemented with 0.25 per cent of lysine, resulted in distinct gains in weight and body lengths. Tryptophane added to corn unsupplemented with lysine showed a slight depletion in gain in weight but no effect on body lengths.—H. H. Mitchell and D. B. Smuts, *J. Biol. Chem.*, 95: 263 (Feb.), 1932.

**The Relation Between Dietary Cystine and the Growth and Cystine Content of Hair in the Rat**—Paired feeding experiments were the basis of the work reported to determine the relation between cystine and hair growth. At the conclusion of the experiment, the rats were killed and hair completely removed from the body, thoroughly dried and weighed. The hair growth measurement was determined by computing the weight of dried hair per sq. cm. of body surface.

The rats were fed the same rations as were recorded in the experiment of Mitchell and Smuts on amino acids. With beef at the 8 per cent protein level previously supplemented by cystine all pairs exceeded the controls in weight of

hair per sq. cm. of body surface as well as in the cystine content of the hair itself. On the 20 per cent protein level, the cystine supplement did not show increased hair growth, but a reduction in most instances.

In the case of the wheat protein, very little difference was noted in the hair growth and hair per sq. cm. in the rats on the supplemented diet. When cystine is added to a diet which is not deficient in this amino acid it exerts no special effect on hair growth and cystine content or keratinization of the hair.—D. B. Smuts, H. H. Mitchell and T. S. Hamilton, *J. Biol. Chem.*, 95: 283 (Feb.), 1932.

**The Necessity of Copper as a Supplement to Iron for Hemoglobin Formation in the Pig**—The authors having announced in an earlier paper (*J. Nutrition*, 2, 277, 1929–1930) that ferric chloride effected almost as rapid recovery in anemic pigs as iron and copper together, this experiment was undertaken with particular care to eliminate all possible contamination by copper.

Suckling pigs were taken from their mothers at 5 days of age and put into individual wooden pens and given whole cow's milk until they were distinctly anemic. Iron as purified ferric chloride was then given and when no further improvement was shown copper as copper sulphate was added. Hemoglobin was determined weekly. All pigs developed anemia within 4 weeks on the milk diet, and were kept anemic until the hemoglobin decreased to values below 2 gm. per 100 c.c. of blood.

Twenty-five mg. of purified  $\text{FeCl}_3$  raised the hemoglobin content 5 gm. in 4 weeks. When no further improvement was noted, 5 mg. of copper in addition to the iron effected a rapid improvement in all pigs, hemoglobin values being raised from 3.6 to 12 gm. per 100 c.c. of blood in 5 to 6 weeks at-

tended with increased activity of the pigs.

From this experiment the authors conclude that where experiments report hemoglobin regeneration due to iron alone, there is a probability that the animals are receiving sufficient copper from some other source.—C. A. Elvehjem and E. B. Hart, *J. Biol. Chem.* 95: 363 (Feb.), 1932.

**The Effect of Pasteurization on the Bacterial Flora of Low Count Milk**—Improved methods of milk production during the past few years have resulted in a marked reduction of the bacterial contamination of raw milk. As a result of the pasteurization of this low count milk certain problems have been developed which were not often encountered when milk of a greater bacterial content was being passed through the pasteurizer. It was noted (1) that such milk frequently does not coagulate even after a considerable period of time, and (2) that the absence of coagulation is oftentimes accompanied by the development of pronounced off flavors and odors.

Studies carried out at the State College of Washington were designed to give information on the types of bacteria surviving the pasteurization of low count milk, the changes occurring in the developing flora subsequent to pasteurization and the relation of this flora to the changes taking place in the milk.

Twenty samples of freshly drawn morning's milk were used in this experiment. Each sample was divided into two equal portions and one portion pasteurized at 142° F. to 143° F. for 30 minutes. Both the raw and the pasteurized portion of each sample were divided again, and a representative sample of each incubated at temperatures of 68° F. and 45° F. respectively.

Each sample under observation was examined for flavor daily, and when an off flavor had developed so that the

milk was unfit for consumption it was considered spoiled. Differential and total bacterial counts were made on the raw and pasteurized portions of each sample at the time they were fresh, and again at the time when spoilage was evident. These counts were determined on Bacto-nutrient-caseinate-brom-cresol-purple agar plates, incubated at 37° C. for 48 hours. Acidity and Cooledge score determinations were made on the raw and pasteurized portions of each sample at the time the samples were fresh and at the end of each 24 hours throughout the incubation period. The average bacterial count on twenty samples of fresh milk before pasteurization was 3,467 per c.c., and after pasteurization 377 per c.c.

The bacterial flora of raw and pasteurized milk was divided into three principal groups: (1) Acid-producing types, (2) Proteolytic types, and (3) Alkali forming and inert types.

The differential plate counts showed the comparative percentages of these bacterial groups developing in incubated raw and pasteurized milk.

*Percentage Distribution (based on average for 20 samples)*

<i>Initial Raw Milk</i>	<i>Initial Pasteurized Milk</i>
Group 1 = 26.17%	14.64%
Group 2 = 0.76%	0.62%
Group 3 = 73.07%	84.74%
<i>Raw milk incubated at 68° F.</i>	<i>Pasteurized milk incubated at 68° F.</i>
Group 1 = 68.69%	25.51%
Group 2 = 0.038%	23.74%
Group 3 = 31.25%	53.76%
<i>Raw milk incubated at 45° F.</i>	<i>Pasteurized milk incubated at 45° F.</i>
Group 1 = 62.15%	11.38%
Group 2 = 11.29%	13.85%
Group 3 = 25.56%	74.77%

The Cooledge score and titratable acidity determinations furnished additional correlative evidence relative to the groups of organisms responsible for the changes occurring in incubated raw and pasteurized milk.

The results of this investigation indicate that when milk of low initial bacterial content is pasteurized, the acid-

producing bacteria are not of major importance in the spoilage of the milk. The results of this examination also indicate that spoilage in this type of pasteurized milk as determined by off flavor and odor without souring may be attributed to the action of the proteolytic and alkali-forming and inert types of bacteria.

The evidence reported in this paper bearing on the groups of bacteria surviving pasteurization and causing the subsequent changes in milk does not fully agree with the results obtained by other investigators. The authors suggest that this disagreement in results may be due to the fact that other investigators have worked with milk of a relatively high initial bacterial content, while this work was carried out with milk of a relatively low initial bacterial content.—L. A. Black, C. C. Prouty, and R. A. Graham, *J. Dairy Sci.*, 15: 99 (Mar.), 1932.

**Vitamin B Content of Bread—**Previous investigations having indicated the probability that vitamin B in bread is largely dependent upon the amount of yeast, work was undertaken to determine how much brewer's yeast should be added to bread to provide for a sufficiency of this vitamin.

Commercially baked bread containing variations in the quantities of dried brewer's yeast was fed to pigeons. The supplements of dried yeast varied from 0.36 per cent to 1.2 per cent. The pigeons were fed only the bread and

water. When no supplement of brewer's yeast was added, the pigeons suffered from polyneuritis. Pigeons which lost weight on yeast-free bread recovered with the bread containing 0.3 per cent dried brewer's yeast, although slower than those which received a supplement of 0.5 per cent.

In one group, pigeons which were fed at the start with 1 per cent yeast supplement, which was then substituted with bread containing 0.3 per cent, showed evidence of malnutrition and one bird had polyneuritis. In other pigeons a decrease from 1 to 0.5 per cent, then 0.3 per cent, showed only slight evidence of vitamin B deficiency.

Another experiment was undertaken to determine the effect of heat and pH on vitamin B activity. The pH of the dough was 5.6 and the finished loaf 5.5, and the temperature in the center of the loaf was 90 to 100° C., during baking, for only a few minutes. Similar results were obtained by feeding this bread with its supplement of dried brewer's yeast as were reported by other investigators who fed the yeast independent of the bread.

From these experiments it was concluded that bread is deficient in vitamin B but this may be supplemented by the addition of brewer's yeast in amounts sufficient for pigeons between 0.3 and 0.4 per cent, and that the pH and temperature in baking do not destroy the vitamin B activity.—Yoshitaka Hashitani and Tsunenaka Sako, *Cereal Chem.*, 9: 107 (Mar.), 1932.

## INDUSTRIAL HYGIENE

**New Safety Code for Elevators—** A revised safety code for elevators has been completed by the U. S. Bureau of Standards and has been approved by the American Standards Association. The code embodies new types of control and additional safety provisions made necessary by the advent of high speed elevators. Elevator buffers have been redesigned and specifications for tests on buffers, terminal stops, interlocks, and safeties have been developed.

The code permits two story elevators to serve two stories at the same time, two operators being used. Provisions are made so that the elevators may not be put into motion unless both doors are closed. The safe operation of freight and passenger operated elevators as well as dumb-waiters and escalators are covered by this code. *Month. Labor Rev.*, 34, 3: 569 (Mar.), 1932. L. G.

**Coal Mine Accidents in United States—**Recent statistics reported by the U. S. Bureau of Mines for the year 1929 disclose a fatality rate of 3.19 per million tons mined in bituminous mines, a decrease from the year 1928. For anthracite mines the rate was 6.53 an increase over that for 1928. There were 2,187 deaths in coal mines in 1929 yielding a rate of 3.59 per million tons, a decrease from a rate of 3.78 deaths per million in 1928. *Monthly Labor Review*, 34, 3: 569 (Mar.), 1932.

L. G.

**The Impinger Dust Sampling Apparatus as Used by U. S. Public Health Service—**This contribution describes the present form of the Greenburg-Smith impinger apparatus as used by the U. S. Public Health Service. The essential portion of the apparatus is the

impinger tube and sampling flask or bottle through which air is drawn by means of an electrically driven, compressed air driven, or hand actuated suction device. The method of sampling and analysis of the dust is described in detail. The impinger apparatus has found wide use in the sampling of air, not alone for atmospheric dust but also for chromic acid mist, lead dust and fumes and sulphur dioxide.—Leonard Greenburg and J. J. Bloomfield. *Pub. Health Rep.*, 47, 12 (Mar. 18), 1932.

L. G.

**The Measurement of Radiant Heat in Relation to Human Comfort—**This interesting and valuable contribution serves to emphasize the importance of radiant heat in the estimation of indoor atmospheric conditions along with dry bulb temperatures, relative humidity and air motion.

In order to determine the radiation heating effect the author experimented with several different types of black body thermometers. The most satisfactory was found to consist of a mercury and glass thermometer inserted into a globe made of thin sheet copper, 6 inches in diameter. The outside of the globe was painted mat black.

Studies made with the copper globe thermometer using a gas fire, stove, and ceiling panels as the source of heat, indicated the subjects to be comfortable at temperatures ranging from 61.4 to 62.9°; these temperatures being the total of the air temperature plus the corrected effectual radiation temperatures. The mean surface temperature of the clothing of the two subjects used in these experiments ranged from 70.8 to 73.6°, taken at 7 points on the body.

Observations made with the copper

globe thermometer with heating sources of various kinds, either stoves, overhead heaters, ceiling panels and underfloor heaters, indicated that, as might be expected, the globe thermometer is to some extent selectively warmed, depending upon the location of the heating source with respect to the thermometer. It is to be noted that with a ceiling panel 9 feet above the globe thermometer the top segment of the thermometer possesses an excess temperature of  $2.6^{\circ}$  and the bottom segment an excess temperature of but  $0.8^{\circ}$ . With ceiling panels at a temperature of about  $95^{\circ}$  radiation is so mild as to be scarcely perceptible to the head of a person sitting directly beneath.

Experiments made in a large lecture hall equipped with a ceiling hot water panel heater and an auxiliary plenum air system showed that negative radiation (cooling) was produced by the cold walls and floor of the room, in spite of the fact that the plenum system was delivering air at a relatively high temperature.

In these experiments it was found that a far more uniform and equable temperature was maintained by the panel heating system when the plenum system was discontinued. The author concludes that "an air current of 270 feet per minute lowered the effectual radiation temperature induced by a gas fire to less than a half, and lowered that induced by a stove to a third of the respective radiation temperatures observed in still air."—H. M. Vernon, M.D., *J. Indust. Hyg.*, Mar., 1932, pp. 95–111. L. G.

**Recent Research into the Causes of Industrial Accidents**—Although the avoidance of dangerous practices and the guarding of machinery have ac-

complished considerable good in the prevention of accidents, there is still room for additional measures designed to reduce the frequency of industrial accidents. The author points out that, of the external factors affecting accident causation, fatigue, and poor atmospheric and lighting conditions may be important contributory factors. Accidents appear to be more numerous among younger persons, and among those who experience higher accident rates, the rate of illness is as a rule high.

The personal factors affecting accident causation are discussed by the author, who points out that certain persons are more prone to accidents than are others, and that those having an excess number of trivial accidents, as a rule suffer an excess number of more serious accidents. As a result of recent investigations of accident statistics, it has been possible to construct a very valuable table "by means of which it is possible to determine whether the accident rate of a department is mainly due to factors affecting all members equally or to the fact that it contains certain accident prone individuals." The value of such a procedure is obvious, and it seems equally obvious that great benefit should, at least in certain cases, result from studies of this type.

Psychologic studies showed that persons who failed in certain sensorimotor tests had an accident rate two and one-half times greater than those who had passed these tests.

The importance of complete accident and sickness records is stressed as an aid in the prevention of accidents. In this connection the use of the card index system is preferable in the opinion of the author.—Eric Farmer, *J. Indust. Hyg.*, 14, 3: 84 (Mar.), 1932. L.G.

## CHILD HYGIENE

THE day peculiarly the child's own is May Day. During the past 8 years the interest and attention of the nation have been gradually drawn to a specific consideration of children's health needs upon that day. One city that was particularly interested in May Day in 1931 was Springfield, Mo., and it developed this interest in a "May Day Conference" during a period of 3 days. The Parent-Teacher Association sponsored the program.

Committees were planned after the manner of the White House Conference Committees, but the studies made were confined to the city of Springfield. Committee A was called "Healthful Living Through the Twenty-four Hour Day," and was composed of 5 sub-committees. One of these sub-committees was on the "Home's Contribution to Health Education," and had a parent for chairman. The other 3 members were a school nurse, a classroom teacher, and a principal. The chairman sent a letter to 61 principals and teachers, representing 21 schools, asking each teacher to call a meeting of parents of the children in her room for the purpose of getting facts regarding home health habits of their children. Three hundred and ninety-seven mothers attended and 1,313 children were represented.

The mothers were asked to list facts about the health habits of their children while at home, and the following tabulated results came from these meetings:

Health habits being practiced in the home	129
Health habits which, in the parents' opinions, are difficult to establish	101
Health habits with which the mothers wish aid	71

From this material the committee reached 4 definite conclusions, and made the recommendation that "Some form of health edu-

cation be established whereby parents may get a better knowledge of how to direct their children in desirable health habits—mental, emotional, social, and physical." The committee goes on to give a detailed plan of how this may be done in Springfield, Mo. This is an excellent program because it is an outgrowth of their own study, stimulated from without by a national organization and by the White House Conference, but adapted to their own needs.

Portland, Ore., observed May Day in a variety of ways. One of the most far reaching of these was a series of 18 radio talks on the points of the Children's Charter, sponsored by the Portland branch of the American Association of University Women, and broadcast over KGW. Each talk was definitely tied up with the White House Conference.

County nurses, May Day chairmen, and others organized groups of mothers and clubwomen all over the state to listen to these broadcasts, scheduled from March 21–April 30. At club dinners and Health Association dinners and at school exercises the White House Conference was also the principal topic of the speakers.

Newspaper advertisements in the leading Portland papers contained frequent references to May Day—Child Health Day. The official *Bulletin* of the Portland churches with its series of May Day articles also reached many people. Newspapers, stores and other business firms, as well as men's and women's clubs, took an active part in spreading the May Day message of child health.

The School Division of the City Health Bureau coöperated with the Parent-Teacher Association in a huge Summer Round-up of the children. At 45 clinics 1,026 children were examined—an increase of 319 over last year. In almost every instance the mothers accompanied the children to the clinic and received advice and recommendations from the physician.

Visiting nurses, doctors at the infant welfare conferences and visiting teachers sponsored special projects and talks on child health. A new step was taken by the Visit-

ing Nurse Association in its May Day talks to student nurses at 2 of the hospitals. At 2 of the libraries meetings were held for prospective mothers, and the Portland Library Association displayed announcements and posters on May Day, and recommended children's books and books on child care. At the Marshall Street Community Center where the regular monthly meetings for mothers had their origin in an earlier May Day, there were programs for both mothers and children. The Neighborhood House also gave its annual May Festival.

The Portland League for the Hard of Hearing held a meeting on May 2 reporting on what the organization is doing for the handicapped child. Through the Girl Scouts, Camp Fire Girls, 4-H Clubs, Young Men's Christian Association and Young Women's Christian Association many hundreds of young people and their parents observed May Day in health contests and Play Day events.

Close on the heels of May Day, comes Mother's Day, which the Maternity Center Association of New York City would turn into something better than an occasion for greater commercial activity throughout the country. It suggests that the practical demonstration of affection for the mothers of the country would be to assure them safety in becoming mothers and strength and health afterward. Its efforts have not extended over so long a period as those for the observance of Child Health Day, having been started only in 1930, but they are equally deserving of attention.

The association calls attention to the fact that the puerperal death rate in the United States is unnecessarily high, that it can be reduced greatly by adequate and skilled obstetric care, and that the

public should be educated in the essentials of such care. It has sent out material to daily and weekly newspapers, magazines and trade journals all over the country; the Metropolitan Life Insurance Company, the Borden Company, and Parke-Davis Company devoted newspaper and magazine display advertising to the importance of adequate maternity care; governors and mayors issued proclamations and health commissioners wrote articles and broadcast over the radio; ministers preached sermons regarding better maternity care.

This year the Medical Society of the State of New York is taking the lead in that state to teach the public the need for adequate maternity care. This society approved a plan to send every physician in the state copies of a leaflet for distribution to patients, entitled "A Message to Expectant Mothers and Fathers from the New York State Medical Society." This circular outlines the fundamentals of maternity hygiene advising medical care from the time the woman believes she is pregnant until the doctor says she is able to resume her regular activities and responsibilities and to care for her baby.

These leaflets are not being sent to physicians directly by the society, but through the coöperation of the Maternity Center Association of New York City. A letter accompanies the circulars offering to send physicians additional quantities if desired, and the response from the medical profession is very favorable.



## PUBLIC HEALTH NURSING\*

**County Public Health Nursing in Texas**—The area of Texas is approximately the same as the combined areas of Wisconsin, Michigan, Illinois, Indiana, Ohio, and Kentucky. Few realize the vastness of the state whose climate ranges from the semi-tropical in the south to ice and snow and frosty winter winds in the north. In the west are the prairies and plains where cities and industries are fast developing, in the east is the pine country with its cotton fields and large negro population.

Texas has 254 counties within its borders. Forty of these have full-time county nursing services. There are 200 counties left which have no organized public health nursing service.

It was the Texas Congress of Parents and Teachers which years ago petitioned the legislature for a Bureau of Child Hygiene in the State Department of Health, and it was successful. As in many other states, the American Red Cross helped this department get started by financing and supervising county nursing services jointly with the state. During the first year of the bureau, the University of Texas had a School of Public Health Nursing and trained 58 public health nurses who were placed in counties throughout the state. From 1921 to 1929 federal money which came to Texas through the Shepherd Towner Act helped greatly to expand local public health nursing services. Since then the State of Texas itself has financed the nursing program. The bureau's plan now is to put as much money as possible directly into nursing services in the various counties, and in order to

stretch the appropriation over as large a territory as possible, the counties are asked to match the state and federal funds for this work. Since May, 1931, also, 22 public health nurses have been serving in 100 counties in the drought area of Texas on emergency funds from the federal government.

The state does not inaugurate public health nursing services in a county unless there is a nursing committee formed to be "additional arms, legs, and brains to help with community health problems." This committee promotes the work of the county nurse and interprets the public health nursing program to the people. It is made up of representative people such as the county health commissioner, the county superintendent of schools, the chairman of the county council of parents and teachers, and others. A field supervisor of nursing is provided by the state bureau to assist in organizing county committees and nursing organizations and to give every help possible to the nurse when she is employed.

In order to show the great number of counties in Texas which had never had public health nursing services what they could accomplish, 2 years ago a special appropriation was made by the legislature to the Bureau of Child Hygiene, which provided for 4 white and 2 negro state itinerant public health nurses. The state finances these itinerant services entirely and the nurses stay from 4 to 6 weeks in a county. In order to have these nurses the counties must meet certain definite requirements: (1) a written request for the service must go to the State Department of Health from certain officials and representatives of certain service clubs; (2) an endorsement and request must come

\* For a recent printed matter on other material relating to public health nursing to E. J. MacDonnell, State Health Officer, Indianapolis, Ind.

from the county medical society; (3) a county health committee must be appointed by the county court to assist the nurse; (4) the county must furnish incidentals needed in the nurse's work, and an office.

The negro itinerant nurses work entirely with their own race, and they have received wonderful coöperation.

The American Red Cross has also furnished itinerant nursing services in Texas for several years. The Red Cross itinerant nurse remains from 3 to 6 months at a time in a community. Her salary and other expenses are paid by the American Red Cross, and the Chapters receiving the service reimburse the national office.

As a result of the itinerant nursing services, several counties have employed full-time nurses. Many of the other counties which have had a taste of this service are determined to continue to work for an appropriation to finance a full-time nurse. Counties are sending in more requests for itinerant nurses than the state can grant. The itinerant nurses have "provided an opportunity for the general dissemination of individual education in public health, the value of which cannot be measured by statistics or during a single generation" in counties that have previously showed no concern about public health matters.

#### REFERENCES

- H. H. Barnett and L. E. Ledbetter. Generalized Public Health Nursing in Texas, *Pub. Health Nurs.*, XXIV, 3: 131-133 (Mar.), 1932.  
 Katherine Haquist. Itinerant Nursing in Texas, *Pub. Health Nurs.*, XXIV, 3: 134-136 (Mar.), 1932.  
 Myra F. Cloudman. Health Work in Texas Under the Red Cross, *Pub. Health Nurs.*, XXIV, 3: 140 (Mar.), 1932.

**The Public Health Nurse and Rural Sanitation**—Recently the Sanitary Engineering and the Public Health Nursing Departments of the Indiana State Board of Health held a Sanitary Institute for public health nurses in southern Indiana. The nursing department in preparing its part of the pro-

gram searched through a great many books and public health and nursing magazines for material on this subject as it applied specifically to public health nurses. Almost nothing was found.

On a recent visit to the Tennessee State Health Department at Nashville the matter was discussed with Malvinia Nisbet, Supervisor of Public Health Nurses, and she mentioned a paper which H. S. Mustard, M.D., of the Tennessee State Department of Health had read at a Regional Health Workers' Conference held in Tennessee in 1931. Dr. Mustard gave the following as duties and opportunities of the public health nurse in a county health department in the execution of an environmental sanitation program:

1. To gain a clear understanding of the scientific basis of sanitation as it relates to prevention of specific diseases.
2. To gain a clear understanding of the sanitary problems of the area as a whole, of every community, and of each home visited.
3. To gain a clear understanding of the sanitation program in all its phases, both as to policies and procedures, and also as to technic.
4. To integrate each visit directly or indirectly with the need for sanitation. In one way or another this is possible with every service rendered by the public health nurse.
5. To exert a special effort, in cases where communicable diseases exist, to insure immediate provision of sanitary improvements: protected water, milk control, proper excreta disposal, insect exclusion, or even the wearing of shoes in hookworm families.
6. To assist intelligently, interestedly, and tenaciously in discovering the source contacts in those diseases whose spread is associated with defective environment. This applies particularly to painstaking investigation in connection with typhoid fever. Often a nurse, through the woman of the house, can gather information and can obtain stool and urine specimens, where others would be unable to obtain this material for laboratory examination.
7. To teach in the home the essentials of milk and food sanitation. Such instruction may vary from protection of food from flies to removal of the privy from the vegetable garden.
8. To teach in the home the use and care

of screens and to demonstrate the patching of screen wire.

9. To teach the importance of safe excreta disposal and safe water, and to explain how these improvements may be brought about.

10. To make a sanitary survey of every home visited, go over the existing situation with the woman of the house, to make to her recommendations for improvement, recording findings on Form No. 300, and routing this record to the files through the sanitary inspector.

#### REFERENCE

Papers presented at Regional Health Workers' Conference, Tennessee Dept. of Public Health, Second Annual Meeting, 1931, p. 52.

In Indiana where there are no full-time health units, the county nurse is the only full-time paid health worker. It is doubly important for her to know both content and methods in sanitation. At this Indiana Sanitation Institute which was attended by 25 public health nurses, great emphasis was placed on the fact that the public health nurse's part in a community sanitary program is chiefly education, and not administration or enforcement of laws.

Far reaching results are bound to come from this institute as illustrated by two letters that have recently come from two of the county nurses who attended. One wrote that she hesitated long before she decided to drive the 100 miles to attend, but she felt more than repaid by the help and suggestions she obtained. Along with her letter she sent an order for 500 copies of bulletins on water, milk, and sewage sanitation, to be used as textbooks in her adult Red Cross Home Hygiene classes.

Another county nurse, working in one of the counties having the highest death rate from typhoid, writes:

I have a lot of ideas I want to put into action that I got from the Sanitation Institute. At my last county nursing committee meeting we started a whispering campaign about sanitary privies. At first the women thought it was very funny, but after we had looked at the maps and graphs and discussed them they decided the matter should not be whispered but fairly shouted.

**The School of Nursing and Fundamental Needs in Public Health Nursing**—Studies have shown that approximately 85 per cent of all sick people are cared for at home, so it is very important that nurses be prepared to adjust themselves to home situations. Nearly all public health workers and private duty nurses work in the homes, and this throws a challenge on the nursing schools to give their students the preventive as well as the curative point of view.

In our present system of nursing education nursing schools, for the most part, avoid the field of preventive medicine in their plan of instruction, probably either because it is not considered fundamental in the training of the nurse or because the instructors and nursing staff are not abreast of the progress in scientific thought. They apparently feel that the nurse who is going to specialize in public health nursing can gain the public health point of view in her postgraduate course. But the nurse should have this before she takes the postgraduate course.

The private duty nurses need the public health point of view also, and since they do not take postgraduate courses in public health nursing they often never obtain it. This is serious, as there is no dividing line between sickness and health and the public expects every nurse to be a health teacher.

If it is important for the nursing school to be concerned about the quality of its health teaching it is just as important for the public health nurses working in a community to inspire and influence the teachers and instructors in the nursing schools along public health lines. Often the public health group isolates itself and fails to take advantage of its opportunities to demonstrate public health needs to the nursing school staff.

The nurse who practises in the home must be skilled in her art. Too many

nursing schools teach the nurse how to do perfect work with the fine equipment in the hospital without showing her how to adapt nursing measures to the different and often inadequate equipment in the home. It is considered desirable to teach home nursing to lay groups, and how much more necessary it is that student nurses be familiar with the course and its practical application!

The care of the sick at home requires a nurse who can teach nursing. The visiting nurse must instruct the family to give nursing care between her visits. The nursing school cannot train her

completely to do this but it can create the right attitude towards teaching as follows:

1. Prepare the nurse carefully in the details of nursing practice, emphasizing the why and wherefore of the procedure and not the mere mechanics.
2. Include in the classroom demonstration procedures applicable to home use.
3. Encourage the student to develop team work in the care of the sick.--

Clara B. Rue, *The School of Nursing and Fundamental Needs in Public Health Nursing*, *Am. J. Nurs.*, XXXII, 3: 311-315 (Mar.), 1932.

## EDUCATION AND PUBLICITY\*

**How Do Local Editors Rate Public Health as a Source of News?**—Can you cite examples of incidents, unusual situations or other experience that would make good newspaper feature stories?

What does the buyer of printing need to know and to do to get the best results from the printer and to cut the costs?

Is the impression made on the reader by your annual report mainly one of quantity of work done or is the quality brought out also?

The above questions are selected at random from "A Brief Course in Social Work Publicity" which was prepared by Mrs. Routzahn for informal study groups of public health workers and social workers. The course consists of outlines for discussion and clinic examples on News Stories, Newspaper Feature Stories, Social Work Case Stories, Appearance of Printed Matter, Annual Reports and Letters and Letter-heads.

If you are interested in organizing a group for a series of from six to ten 1-hour or 2-hour sessions on publicity methods, write to Mrs. Mary Swain Routzahn, Russell Sage Foundation, 130 E. 22d St., New York, for further information.

**Is It a New Idea?**—Health ideas expressed years ago, or methods used in the "once upon a time" have been noted in this department as a reminder that all that is good is not new and original with this generation of public health workers.

Recently several who had been in tuberculosis work 25 years ago held a brief reunion, with several "youngsters" present. One of the latter acknowledged learning that a recently "discovered" publicity method had actually been used in that far off period. This led to the mention of various campaign methods of today which had actually been used 20 to 25 years ago in the first educational campaigns of the National Tuberculosis Assn. One of these was the contribution of paid advertising space. The "whispering" or "talk-

\* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

ing" campaign used by several community chests in the last 2 years was put on in two or three cities 20 years ago. A recently discovered article by one member of the luncheon group, published in 1895, outlined the main elements of the campaign project as it is now conducted for health and other purposes.

The group of oldsters included P. P. Jacobs of National Tuberculosis Assn.; Ernest D. Easton of New Jersey Tuberculosis Assn.; George Nelbach of State Charities Aid Assn.; Evert G. Routzahn, one-time the original educational campaigner of the National Tuberculosis Assn.

**Were You Among the Few or the Many?**—The "few" were those who did send back to the editor of this department the form asking their judgment upon the interest appeal of what appeared in the department. The "many" were most of those members of Public Health Education Section who received that request.

However a single response regarding the February, 1932, issue made the sending worth-while. Some of his 3 pages of typewritten comment will be published. Here is his scoring: "Interesting?" "Yes" for 4 items; "not much" for 3 items; "no" for 4 items (one "ordinarily, yes"; 2 "because we are not mentioned").

After a few more tests we will report the full vote, and some of the topics will be dropped.

**Is It Fair?**—Particularly in these days of close budgeting of postage and printed matter is it fair to mention in reading lists publications intended for distribution to the teachers or to citizens generally in a given city or state? Within a few months one state health department received requests from 22 cities outside the state for supplies of its health educational material. Some

requests went as high as 50 or 100 copies. Nearly every reference list for teachers names some publications to which individual teachers are not entitled. And some department lists suggest that mothers write to departments in other states for specified publications!

**For the Busy Teacher**—The Board of Education of New York City has distributed to its teachers three manuals of unusual conciseness and completeness in detail. Unfortunately the edition is too limited for outside distribution. But we have secured a few sets to be *loaned to those who send the editor of this department 5 cents postage and a promise to return the set in 10 days.*

The general title: *Supplementary Materials And Suggested Activities To Be Used With The Course Of Study And Syllabus In Health Education For Elementary Schools.* There are three separate editions—for grades 1A-3B, 4A-6B, and 7A-8B.

We don't attempt to pass on the teaching values, but as reference manuals they have points especially worthy of mention. Each is brief (14 to 17 pages); stiff cover; a page of "Materials" is faced by a page of "Suggested Activities" for "All Grades," and separately for each specific grade; for every reference to "Material" there is an address, and for nearly every reference there is a price or "free"; the references are grouped under "Teachers," "Children," and "Posters" (so few lists differentiate between background material for teachers and material to be used directly with the pupils); "Starred items form a good minimum library"; double stars indicate "Of unusual value for anyone interested in health education"; 9 items listed are priced at 10 cents to 35 cents, one at \$1.25, *all others are 5 cents or less, or are free.*

Under "Suggested Activities" there are frequent notes in italics, such as

"This activity helps to . . .," "This activity emphasizes . . .," etc. We commend this publication to all who make up reference lists for its conciseness, clearness, accuracy and uniformity in arrangement, all of which help the busy, busy teacher. It was prepared by a committee of special health teachers, under the direction of Dr. I. H. Goldberger, assistant director of health education, with the coöperation of Mrs. Elizabeth Semenoff of the Bronx Tuberculosis and Health Committee and Mrs. K. Z. Whipple of the New York Tuberculosis and Health Association, which agency published the pamphlet.

**They Object to Repeaters**—At the Montreal business meeting of the Public Health Education Section some general policies were formulated as reported below by Chairman Ira V. Hiscock of the Nominating Committee:

The Nominating Committee of the Public Health Education Section, in submitting its recommendations for officers and Council members for the ensuing year, made certain suggestions regarding future policies. It is believed desirable that as the terms of present Council members expire, new Fellows be elected to the Council in order that new viewpoints may be secured regarding program building, section functions and opportunities. It is assumed, however, on the basis of past experience in the section, that former Council members will continue to participate in section activities. Another suggestion was to the effect that there should be no "promotion" plan from one section office to another. In other words, officers should be selected each year on the basis of what, in the judgment of the Nominating Committee, and in the light of circumstances, would promise the most useful working group for the coming year.

**A Public Health Teacher**—One phase of the work of the district health officer described in *Public Health News* (Jan., 1932), New Jersey Dept. of Health:

Public health education is an activity in which the district officer takes an active, personal part. He furnishes the press of his district with facts and news items, gives talks to

interested groups, and arranges for the distribution of literature published by the department. His discussion of public health matters includes tuberculosis as well as the other communicable diseases. He should be a valuable aid in keeping the inhabitants of his district health-conscious and in guiding the public away from the fads, cults, and nostrums, to sound preventive and curative measures.

**What Other Teachers Are Doing**—So far as we know, the "Health and the School" department of *Hygeia*, 535 North Dearborn St., Chicago, is the most accessible record of current actual classroom practice in teaching health. A section of the department reports on "New Health Books and Teachers' Materials." And the body of the magazine carries a wealth of material for all who teach—or speak or write on health topics. Since a free sample copy will be sent upon request we need not go into detail. But we do want to quote the following:

**A Scientific Spirit in Health Education**—After a brief discussion of health superstitions, ancient and modern, the editor, J. Mace Address, says:

The human body has such remarkable vitality and power of adjustment that in many instances it cures itself. To the quack and his followers this leads to the conclusion that many a cure is due to their particular remedy. But science rests on the combined and compared experience of many students who often devote their lives to particular problems. Their findings are checked, tested and tried thoroughly before they are used in the treatment of human ills or in promoting positive health.

Here is a text of much needed popular education. Dr. Address makes the application to the classroom through a description of some new texts from the University of Texas which we have not seen.

#### DIPHTHERIA

"Diphtheria: Michigan Death Rate 1901-1930," *Public Health*, Michigan Dept. of Health, Lansing. Dec., 1931. Effective diagram.

"The Fight Against Diphtheria," editorial. *Journal*, American Medical Assn., 535 N. Dearborn St., Chicago. Review of progress. *Ask for clip sheet*. Free.

"Depression Hits Diphtheria" (lowest previous record in New Jersey practically cut in half in 1931). *Public Health News*, Trenton. Jan., 1932.

The New York City Dept. of Health supplies a diphtheria warning notice for physicians to mail to parents of children under 5 years of age.

#### TRAINING COURSES

Prof. C. E. Turner will give a 6 weeks' summer course in health education at University of Hawaii. Opens June 29.

A course for high school teachers will be given during the spring term at Massachusetts Institute of Technology.

A summer course for teachers of fresh air classes will be given at Teachers College, New York, by Prof. H. G. Rowell and Louise Strachan.

In common with other state tuberculosis associations the Florida Tuberculosis and Health Assn. held three institutes for public health nurses and medical social workers. The first of the series was given in connection with the annual meeting of the association.

"The Illustrated Lecture: Some Do's and Don'ts in Poster and Project Teaching," by L. K. Wolf. *American Journal of Nursing*, 450 7th Ave., New York. Jan., 1932. 35 cents. Illustrative material prepared by the teacher; material prepared by the student; assembling project material; essentials of a good poster; weaknesses of a poor poster.

Those who are concerned with training on the job for public health workers of various types would be interested in "Forthcoming Lectures And Training Courses" in *Mother and Child* (formerly *National Health*), 5 Tavistock Sq., London, W. C. 1, England. In the Dec., 1931, issue were listed courses and lectures given by 14 or-

ganizations ranging from Natl. Assn. for the Prevention of Infant Mortality to Royal Institute of Public Health.

#### LISTS

"Directories of State and City Health Officers, 1931." *Public Health Reports*, Washington, D. C. Dec. 4, 1931.

"State and Local Social Hygiene Societies in the U. S." *Journal of Social Hygiene*, 450 7th Ave., New York. Jan., 1932. 35 cents. Reprint, 10 cents.

"Whole-Time County Health Officers, 1931." *Public Health Reports*, Washington, D. C. Dec. 18, 1931.

#### MOTION PICTURES

1000 and One: The Blue Book of Non-Theatrical Films. *Educational Screen*, 64 East Lake St., Chicago. 8th edition. 144 pp. 75 cents. Classified under 136 headings, including "Physiology, Health and Hygiene." Both 35mm and 16mm. Useful for sanatoriums and other institutions using any non-health film.

Several 16mm motion pictures, including amateur film, will be displayed at headquarters of Social Work Publicity Council, during the National Conference of Social Work, Philadelphia, May 15-21, 1932. *An amateur health film is desired.*

For the first time a sound trailer is offered in addition to the silent trailer for use in the 1932 Early Diagnosis Campaign during April.

Social Hygiene Motion Pictures, by American Social Hygiene Assn., 450 7th Ave., New York. Revised list. Free. Condensed easy reference data. For example:

Title of film (The Gift of Life); Subject (biology of sex and reproduction); Type of film (narrative and diagrammatic); Suitable for use by (teachers and lecturers); For groups of (adults and young people); Synopsis (Under the guidance of a scientist, a boy . . .); No. of reels (4); Purchase price (35mm \$170; 16mm \$120); Rental per day (\$4.00).

Several pictures on milk, milk production, fruits and vegetables, are offered for charges both ways by Motion Picture Service, International Harvester Co., Chicago.

New York. 5 pp. 10 cents. Synopsis of each play and how to secure copies. Includes "From House to House" (visiting nurse), and "My Son John" (mental hygiene).

#### ADDITIONAL DIET MATERIAL

Current background material and material for copy is easily available.

"Food and Health: " A Study of Consumers' Habits, Editorial. *Journal of American Medical Assn.*, 535 N. Dearborn St., Chicago. Feb. 13, 1932.

"Limited Living." *Monthly Bulletin*, Bureau of Health, Rochester, N. Y. Dec., 1931.

"The Bartlett's Beat The Depression." *Health Bulletin*, North Carolina State Board of Health, Raleigh. Jan., 1932.

"How to Feed The Home Folks In Hard Times." *Commonwealth Bulletin*, Health Council, Citizens' Aid Bldg., Minneapolis. Dec. 15, 1931.

"Living Up To The Food Budget." *Connecticut Health Bulletin*, State Dept. of Health, Hartford. Feb., 1932 (radio).

"Emergency Nutrition Special." *American Child Health News*, Jan., 1932. Out of print.

*Journal of Home Economics*, 101 E. 20th St., Baltimore. Feb., 1932. 30 cents. Several articles.

#### PLAYS

A revised edition of *Plays About Social Problems* lists the plays available for adult performers which have come to the attention of the Social Work Publicity Council, 130 East 22d St..

#### SCHOOLS—CHILDREN

Scientific background material is contained in *Health Bulletin For Teachers*, Metropolitan Life Insurance Co., New York. Free.

In one issue of *School Health Bulletin*, Illinois Tuberculosis Assn., Springfield, addresses are given for securing mentioned printed helps; in another issue, no addresses are given for Office of Education and Children's Bureau. Will all teachers remember these addresses?

"Is There a Formula for Sex Education?" introduces several charts used by Professor T. W. Galloway in the last training institutes conducted by him. They outline concisely what children and young people "should acquire," the three parallel columns being headed "In Knowledge," "In Habits," "In Tastes, Preferences and Attitudes." This material is grouped for "the first 6 years of life," "at the age of 12," "during junior high school," "senior high school youth."—*Journal of Social Hygiene*, 450 7th Ave., New York. Feb., 1932. 35 cents. In the same issue: Report of the Sub-Committee on Social Hygiene of the National Conference on College Hygiene," taken from Proceedings of the conference held in May, 1931. Full report published by National Tuberculosis Assn., 450 7th Ave. New York.



## BOOKS AND REPORTS

**Courts and Doctors**—By *Lloyd Paul Stryker*. New York: Macmillan, 1932. 236 pp. Price, \$2.00.

This useful book is the work of a well known lawyer who served for many years as counsel for the New York State Medical Society and as editor of the legal section of the state medical journal. As the result of a rich experience in defending physicians against malpractice suits, in rendering other valuable legal aid to them, and in writing pertinent monthly comments on the subject, the author has constructed an excellent non-technical treatise on law for practising physicians, who are the rank-est of laymen when jurisprudence is involved.

With the exception of a somewhat paternal and rather long-winded introduction, the book is interesting and practical, and it ought to do much to clarify the legal relationships between doctors and their patients.

Since the book contains nothing at all on public health law, sanitarians will find it valuable only if they are also in active private practice. The book is well printed, has an index, and is written in a pleasing conversational style. The references and citations for each chapter are assembled at the back of the book, which makes their utility almost nil.

JAMES A. TOBEY

**Industrial Hygiene for Engineers and Managers**—By *Carey P. McCord, M.D., assisted by Floyd P. Allen, M.D.* New York: Harper, 1931. 317 pp. Price, \$5.00.

The specialist in industrial hygiene has been favored in his reference work by being able to refer to the excellent text of Kober and Hayhurst. This is

now the standard text in the English language for the industrial specialist.

The large group of plant engineers and managers, men who are in vital, everyday need of help in this field, have, however, up to this time, not been so fortunate. The present volume by Dr. McCord and his associate, Dr. Floyd Allen, fills this need of plant officials most admirably.

No longer is industry content to hire men, put them to work under conditions of an adverse or even unhealthy environment, and to discharge them when they are ill or incapacitated.

The present volume clearly brings out the many-sided nature of the problems of industrial hygiene, and shows how these problems may be solved. In the modern factory the worker is given a physical examination after being hired, and is placed at a task for which he is mentally, physically and professionally suited. His environment, as well as the machinery with which he works, is supervised so as to eliminate, in so far as possible, causes of accidents, and the materials with which he is brought into contact are selected so as to avoid the use of poisonous substances, or they are controlled so as to prevent the occurrence of actual cases of poisoning. Dr. McCord and his associate discuss all of these phases of industrial hygiene in a manner which should give the officials of even the very small plant an opportunity to institute the procedures which the larger plant is enabled to obtain by virtue of its more complete functional organization.

Even under ideal conditions, industrial hygienists recognize the occurrence of the "unavoidable" accident, which makes the provision of the emergency

hospital or dressing station a necessity in every plant. In the chapters devoted to the "medical department in industry," "emergency aid," and "bandaging for the industrially injured," the reader is told not "what to do" but actually "how to do it."

Nor is this the complete scope of the volume at hand, for in addition to the above, there are presented well balanced discussions of the rehabilitation of the injured employee, both monetarily (compensation) and physically. Finally, it should be pointed out that the book is written from the preventive viewpoint, a viewpoint characterized by excellently written chapters dealing with accident prevention, protective garments, dental service, the economics of human conservation in industry, food for the industrial worker, and industrial mutual benefit associations. Engineers and officials of large industries will find this volume of inestimable value and the single chapter devoted to "Health Promotion in the Small Plant" should compel the officials of every small plant to own a copy of this book.

LEONARD GREENBURG

**Manchurian Plague Prevention Service Reports, 1929-1930.** *Anti-Plague Institute, Harbin, China, 1931.* 232 pp.

The Manchurian Plague Prevention Service was established directly after the severe plague epidemic in 1910 and 1911 (60,000 deaths). It has been in existence sufficiently long and without interruption by internal chaos to build up an extensive organization with facilities for hospitalization, field investigation, laboratory research, and epidemiological control. During quiescent periods the organization serves the people in the vicinity of its hospitals in ordinary ways. Formerly an independent service, this seventh biennial report announces its absorption into the National Health Administration.

The second extensive plague epidemic occurred in 1920 and 1921 (9,000 deaths). Another was expected at the end of the decade in 1930 and 1931, but failed to appear. The reasons given for this are: the depletion by wholesale hunting of the tarabagan, which species constitutes the animal reservoir of plague, and better precautionary measures taken by the hunters at the instigation of the Plague Prevention Service. Recently when sporadic cases of plague occurred, most of them were of the bubonic type. Formerly the Service had to fight directly the wild rodents in sparsely populated regions, but now, with Manchuria's population rapidly increasing, it has to deal with the ubiquitous rat in crowded settlements as a potential menace.

This report of the 19th year includes a number of scientific papers by members of the Plague Prevention Service on subjects other than plague. One cannot but wonder, while reading this excellent presentation, under what auspices forthcoming reports on plague prevention service will be issued in view of present developments in Manchuria.

W. W. PETER

**Foods in Health and Disease—By Lulu G. Graves.** *New York: Macmillan, 1932.* 390 pp. Price, \$3.50.

This simply and clearly written text is a concise and up-to-date encyclopedia of common foods with data on the nutritive properties of each. The first section, devoted to foods in health, contains descriptions of the various vegetables, fruits, sugars, nuts, animal foods and dairy products, fats and oils, beverages, and food accessories. The second section takes up foods in disease, including such matters as overweight and underweight, infection, nephritis, gout, arthritis, epilepsy, gastrointestinal troubles, diabetes, deficiency diseases, diseases of circulation, and the allergies. Several appendices give tables of vita-

mins and edible organic nutrients. The book is adorned with numerous excellent illustrations and probably as a consequence is printed on a heavy, glossy paper. Each chapter has a bibliography and there is a good index. The book will be of value to all students of viands, victuals, aliments, comestibles, and pabulums. JAMES A. TOBEY

**A System of Bacteriology in Relation to Medicine. Vol. VI.** London: His Majesty's Stationery Office, 1931. 538 pp. Price, \$6.00. Postage extra.

This volume is one of the most interesting of the series so far published. The first chapter considers the relation of bacteria to disease. The other 16 treat of immunity from all angles, beginning with the problems of natural immunity and treating of toxins and every phase of the question which one can think of. It is a comprehensive study of this tremendous and important question, though it does not include all of the knowledge which has been accumulated concerning active immunity, antigens, and antibodies. The first chapter is the only one which can be criticised seriously. It strikes us as inadequate, treating the subject of aggrsins, for example, in an incomplete manner. The last chapter gives a survey of the field of chemotherapy.

The peculiar strength of this volume lies in the enumeration of questions which arise in regard to most of the subject matter. The problems of research in immunology are so numerous and the data often so unsatisfactory that we cannot but value highly the suggestions and analytical approach to their solution here given.

The volume as a whole is excellent, though there is some lack of balance in the various chapters, which are written by different authors, some treating their subjects too briefly and others indulging in unnceary repetition. Excellent but

not exhaustive references to literature are appended to each chapter.

An index would probably add too much to the expense, and one for the entire system will doubtless appear in the last volume, but reading and study of individual volumes would be easier if each had its own, though this is a minor fault, since the Table of Contents gives an excellent analysis of what each chapter contains.

The printing and make-up are excellent. We consider this volume as worthy of those which have gone before, and the whole series as indispensable to any student of the enormous subject which is covered.

MAZŸCK P. RAVENEL

**The Vitamins—By Ethel Browning. M.D.** Baltimore: Williams & Wilkins, 1931. 575 pp. Price, \$10.00.

This is Volume I of a series entitled "Monographs of the Pickett-Thompson Research Laboratory." It not only treats of the biochemistry of the vitamins, but also of the clinical and experimental aspects. For this reason the work will be of interest not only to the student and biochemist, but also to the dietitian and clinician.

The book is divided into 3 main parts: the vitamins in general, the fat-soluble vitamins A, D, and E, and the water-soluble vitamins B and C. The historical sketch is followed by a review of the literature on the origin of the vitamins and the problems relative to their synthesis. Their mode of action is presented as postulated under the theories of hormone action, acceleration of tissue oxidations, maintenance of mineral equilibrium, and regulation of trophic changes. There are few aspects of the vitamin problem that are not adequately presented.

This is no mere compilation. It is exceedingly interesting because it has not merely followed a definite order, but the present conflicting knowledge is

given in a manner to offset completely the usual tedium attending the reading of such a treatise. The widely accepted classification of the vitamins according to their connection with specific disorders of the body has fortunately been followed.

Though this work is fairly complete, it does not include the entire literature, and for that reason the author has added a bibliography which contains references to papers not mentioned in the text, as well as to those that are. A very valuable part of the volume is that composed of tables showing the vitamin content of foodstuffs, which include the B<sub>2</sub> and E.

It is regretted that references in the text are not numbered to correspond with a number in the bibliography, or that the authors in the text are not given their initials. It is often confusing, where authors have the same name, and one has to hunt through a long list to find the desired reference.

The book is most valuable and the work excellently done. The printing is of the best. All interested in this most vital subject are under a debt to the author, Dr. Browning, as well as to the institution which sponsors the publication.

ESTHER W. STEARN

**Malaria Control by Anti-Mosquito Measures**—By Gordon Covell, M.D.  
London: W. Thacker & Co., 1931.  
148 pp. Price, \$2.00.

As the result of extensive experience in malarial countries, the author has given us an excellent account of the measures which have been suggested and tried for the control of mosquitoes. The book is divided into 3 principal parts, taking up respectively protection against bites, against adult mosquitoes, and against larvae, the last of which contains also a consideration of methods adapted to special circumstances. An appendix, which the author rightly considers an important feature of the book,

is the bibliography of 570 references arranged according to the measures considered. The literature of the world has been drawn upon, and it is hard to detect any omissions. The appendix includes anti-mosquito apparatus, oils, poisons, etc., with addresses of high class firms in various parts of the world from which these materials may be bought. The prices are given in Indian money, which will not be of much assistance to readers in other countries.

The book is well arranged, well written, and adequately illustrated. It is decidedly useful and deserves a wide circulation.

MAZŮCK P. RAVENEL

**Health and Social Evolution.** *Halley Stewart Lecture, 1930*—By Sir George Newman, M.D. London: George Allen & Unwin, Ltd., 1931.  
200 pp. Price, \$1.75.

In discursive and easily readable style the author traces the history of the Public Health Service in England. The story, he claims, is social rather than medical; that is, the "progress of the art of medicine is dependent upon the social evolution of the people."

While the book is a sketch rather than a treatise, there is brought home to the American reader strongly, even though implicitly, the escape of the English public health program from bureaucracy, in our subversive American sense, as well as the fact of significant accomplishment. They have attained community of purpose and effort without sacrifice of the individual and of individual choice and initiative.

The public health program is only part of a vaster social program which, taken in its entirety, does not show unalloyed gains nor complete successes in all detail, and some critical estimate of the gains and losses, both observed and potential, is indulged in as a concluding chapter.

Sir George Newman is one of the

most interesting writers on health matters we have today. He has given us a book that can be recommended to all for information as well as entertainment.

ALLEN E. STEARN

**The Control of Tuberculosis in the United States**—By *Philip P. Jacobs, Ph.D.* New York: National Tuberculosis Association, 1932. 416 pp. Price, \$2.00.

Within the last 30 years what other single disease in the United States has produced as much as tuberculosis in tons of literature, sums of money, number of hospital beds, full-time workers or organizations? In view of the importance of the subject and its many ramifications, it is a most difficult task indeed for anyone to acquire sufficient experience and perspective to qualify him to tell the story of the control of tuberculosis in the United States. Yet this is what the author has succeeded in doing.

Against a brief European background, the author very carefully traces the origin of the antituberculosis campaign in the United States. He describes the significant contributions made by pioneer leaders and organizations including the National Tuberculosis Association which was founded in 1904. Fanwise, both horizontally and perpendicularly, the movement has spread to permeate the entire social order with its influence. In 1931 there were in the United States, 1,471 tuberculosis associations and committees, duly organized and constituted for that purpose.

Due recognition is given to concomitant forces other than the organized antituberculosis campaigns which have been factors in the actual decrease of the incidence of tuberculosis in this country. Health workers in fields other than tuberculosis are often prone to forget the helpful influence of this strongly organized antituberculosis movement because it has come to be so much taken

for granted that tuberculosis is decreasing where there is no organized movement against it. The debate is not at that point. The question is, how much faster has been the decline because of organized efforts against its inroads.

Very illuminating is the author's presentation of the Christmas Seal sale, its origin, its development to where its returns in 1930 were 5½ million dollars. The author shows intimate knowledge of the development of the Community Chest movement in the United States to the point where now 300 communities are so organized. He discusses the relationship between the Christmas Seal sale and the Community Chest movement.

The book is divided into 4 parts. There are 4 chapters on the historical aspects of the antituberculosis movement. There are 17 chapters on the methods and programs in the control of tuberculosis in the United States. Four chapters are devoted to the fundamental policies of the tuberculosis movement in the United States, and 6 chapters to illustrative programs. There is a list of selected references at the end of each chapter. The author has screened the literature and gives a list of books for the tuberculosis secretary. There are lists also for the nurse, for the physician, and for the tuberculosis patient. The appendix closes with a list of periodicals for those interested in the subject of tuberculosis. Finally there is a good index.

During the 24 years devoted to tuberculosis work, Dr. Jacobs has written a great deal. This concise and comprehensive contribution will probably rank as his most important. This book should be in every public and professional library, particularly in medical and nursing schools. Many physicians, many nurses and most public health and social workers will find it invaluable in the professional health field. This book should be classed as one of the books of the year. W. W. PETER

**Medical Supervision and Service in Industry.** *Compiled and published in 1931 by the National Industrial Conference Board, Inc., 247 Park Avenue, New York.* 125 pp. Price, \$2.00.

This is a revision of two previous studies published by the National Industrial Conference Board, and has the advantage of comparing statistics previously compiled with important new material.

A special feature of the study is the inclusion of 53 per cent of the companies employing less than 1,000 employees.

As the monograph states,

A gradual shifting of emphasis from the curative phases of medical care to preventive work and health education is evident. With this development have come corresponding changes in the personnel and equipment of medical departments and in the average cost per employee. Aside from the sociological benefits resulting from the improved medical care of the employees, there has been a reduction of compensation costs and of waste involved in excessive labor turnover, absenteeism, and low labor efficiency.

The chapter headings indicate fairly well the scope of this publication: "The Place of the Medical Department in Industry," "Staff and Equipment," "Physical Examination of Employees," "Industrial Accidents and Their Treatment," "Diagnosis, Treatment, and Prevention of Illness," "Medical Work in the Small Plant," "Medical Records," "Analysis of Work of Medical Department," "Cost of Medical Supervision and Service," "The Value of Medical Work in Industry."

A valuable addition is the appendix, which includes routine and standardized procedures in physical examinations, first aid treatment, a standardized medical terminology, and last but not least the estimated value of medical service in a company of 500 employees.

This is a valuable reference work for

all who have to do with industrial health and safety in any of its aspects.

C. O. SAPPINGTON

**Ronald Ross. Discoverer and Creator—By R. L. Megroz.** *London: George Allen & Unwin, Ltd., 1931.* 282 pp. Price, \$3.75.

There is no medical man living whose life, history, personality, and accomplishments are more interesting than the subject of this work. He is well described as "a many sided genius," but is best known to the world for his demonstration that the *Anopheles mosquito* is the carrier of the malarial parasite. Over this question has raged an unfortunate controversy. The reviewer believes that the evidence supports the claims of Ross. This was evidently also the belief of those in charge of the Nobel Prize in Medicine, which was given to him in 1902. The verses written on the day of his discovery, amended and sent to his wife the next day, have always seemed conclusive evidence of this stand.

The book before us consists of practically two parts: one devoted to Ross's history and scientific work, the other to his literary accomplishments. Few people realize that, in addition to being a bacteriologist and naturalist of a very high order, he is also a poet, novelist, and mathematician. An introduction to the volume by Osbert Sitwell gives high praise to his literary ability; yet the public knows little about this side of the man.

The first part of the book is not only a history of Ross, but of necessity gives also the story of malaria, and enables one to realize what Ross's discovery has done for the world, showing how justly he estimated his discovery in the verse, "I know this little thing a myriad men will save." The volume closes with several appendixes, the first of which might well have been omitted, as it is Ross's answer to the claims of Grassi,

not written in the best temper. The others are bibliographies of his scientific publications, those on mathematics and literature, and finally a list of his awards and honors.

The book is well written. Every page holds the reader, even though he may not be a scientist and acquainted with Ross's accomplishments. A peculiar pathos attaches to the book, appearing at a time when Sir Ronald is in dire straits financially, after a life devoted to the welfare of the public and crowned with success recognized throughout the world. It tells of his grinding work, heart burning disappointments, due to orders from those in authority—for he was an army man—coming at the moment when success seemed imminent; of the claims of others which would have deprived him of the credit so richly deserved.

The author is frankly a hero worshipper when it comes to the subject of his work.

We commend this book to the public and even to those physicians and bacteriologists who have read Ross's *Memoirs*. We trust that it will bring to England a realization of the claims of one of her foremost scientific sons who we believe has not received the recognition due. MAZŸCK P. RAVENEL

**A System of Bacteriology in Relation to Medicine. Vol. IX. London: His Majesty's Stationery Office, 1931. Price. \$6.00.**

This is Volume IX of the System of Bacteriology in Relation to Medicine published under the auspices of the Medical Research Council of England. It is devoted to technical methods, and includes the general index. The authors do not pretend to give all of the useful methods of doing bacteriological examinations, but describe one or more

for each procedure which they have found adequate for their own needs. It is unfortunate that they have not seen fit to include more of the well known American and continental European procedures. In this country, the direct titration of mediums to a desired pH by the use of bromthymol blue has almost entirely replaced the indirect methods in which thymolphthalein or phenolphthalein is used.

To one trained in immunology, it is not entirely clear how the results of the Wassermann test, described on page 208, can be read, "when some of the tubes are quite laked and others are quite opaque," especially in a series of negative tests.

In addition to chapters treating of the usual bacteriological methods, there are others which give details of technic not so well known to many bacteriologists as: isolation of single bacterial cells; filtration; methods of studying filtrable viruses, including their cultivation, preservation, and the demonstration of cell inclusions; the measurement of oxidation-reduction potentials; the determination of electric charge; and the production and isolation of bacterial variants. The chapter on Production of Variants is especially interesting. Of great practical value are the directions for breeding, maintenance, and handling of laboratory animals.

This volume is a fitting ending for the most valuable series which has preceded it. It shows the study and discriminating judgment which characterize all other volumes of the series. The printing and make-up of the book are exceptionally good. Bacteriologists the world over are under a debt of gratitude to the Medical Research Council as well as to the individuals who have done the actual work in the production of these volumes. NEWELL R. ZIEGLER

# A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

**Canadian Opinion on Maternal Mortality**—This summary of the various answers to a questionnaire on the causes and prevention of maternal mortality reveals only that there is little difference in the number and variety of opinions on this subject north and south of the international line.

BROWN, J. N. E. *Observations and Opinions on Maternal Mortality.* Canada Lancet, 78, 4: 108 (Apr.), 1932.

**Pneumonia Type II**—In a study of 1,000 cases with a mortality rate twice that of type I, Felton's serum was found beneficial, though not strikingly so.

CECIL, R. L., AND PLUMMER, N. *Pneumococcus Type II Pneumonia.* J. A. M. A., 98, 10: 780 (Mar. 5), 1932.

**Longevity in Mental Deficiency**—If one wishes to know how long idiots, imbeciles and morons live, what their expectancy is in relation to total population, and of what they die, this paper will prove a gold mine of information.

DAYTON, N. A., *et al.* *Mortality and Expectation of Life in Mental Deficiency in Massachusetts: Analysis of the Fourteen-Year Period 1917-1930.* New Eng. J. Med., 206, 11: 555 (Mar. 17), 1932.

**The Dangers of Childbirth**—The terrified expectant mother who reads this "penny dreadful" will decide that she might as well be taken out behind the barn and shot as to brave the dangers of modern obstetrics. A good example of a popular article with considerable factual basis which produces a thoroughly undesirable and unwarranted end picture.

DEKRUIF, P. *Savers of Mothers.* Ladies Home J., Mar., 1932, p. 6.

**New York Health Centers**—The importance and value of statistics in health center planning is excellently

illustrated in the discussion of the problem of providing local health services to a group of 7 million people living in an area of more than 300 square miles with a population density varying from 2,000 to 84,000 per square mile.

DROLET, G. J., AND WEINER, L. *Vital Statistics in the Development of Neighborhood Health Centers in New York City.* J. Prev. Med., 6, 1: 59 (Jan.), 1932.

**Pollution of Water Supplies**—Numerous examples of the way pollution has entered presumably safe deep-well water supplies are presented in graphic detail.

EASTWOOD, C. H. *Pollution Hazards.* Water Works Eng., 85, 5: 248 (Mar. 9), 1932.

**Typhoid Fever Vaccination**—Persons who have had typhoid fever or prophylactic treatment produce more antibodies in response to subsequent inoculations than do those who have not; the ordinary routine treatment may not produce as much immunity as we have believed; and the severity of the reaction bears no relation to the immunity produced.

FEEMSTER, R. F. *The Effect of Typhoid Fever and of Previous Typhoid Vaccination on the Antibody Response to Inoculation with Typhoid Vaccine.* J. Infect. Dis., 50, 2: 120 (Feb.), 1932.

**Dust Sampling**—The impinger dust sampler is described in detail and its use explained. It is of value not only in the collection of dust particles, but for certain fumes as well.

GREENBURG, L., AND BLOOMFIELD, J. J. *The Impinger Dust Sampling Apparatus as Used by the U. S. Public Health Service.* Pub. Health Rep., 47, 12: 654 (Mar. 18), 1932.

**Organized Health Propaganda in England**—What the Central Council for Health Education proposes to do in



its advisory capacity concludes a stimulating discussion of the whole field of influencing health behavior.

KENWOOD, H. R. The Health Education of the Citizen. *J. State Med.*, 40, 3: 126 (Mar.), 1932.

**Convalescent Serum in Poliomyelitis**—"We failed to obtain statistical evidence that convalescent serum is effective. However, it is not possible to draw the reverse conclusion; namely, that serum is of no value." The authors feel that the study reported justifies its use on a larger scale.

KRAMER, S. D., *et al.* Convalescent Serum Therapy in Preparalytic Poliomyelitis. *New Eng. J. Med.*, 206, 9: 432 (Mar. 3), 1932.

**Climate and Health and Fecundity**—Argument: if storms stimulate metabolism, then goiter, anemia, diabetes, and mental diseases should be overstimulated. Sure enough, proportionate deaths from these conditions are greater in the "storm country" than in the south. You draw your own conclusions about whither we are drifting. The same storms stimulate female fecundity, concludes the author upon statistical evidence which seems a bit thin.

MILLS, C. A. Climate as a Factor in the Health of Man, and Geographic Variations in Female Sex Functions. *Am. J. Hyg.*, 15, 2: 573 (Mar.), 1932.

**BCG Vaccination Again**—The reasons why the author considers BCG unsafe are set forth. He includes the Lubeck disaster, offering it as evidence of reversion, because in his opinion contamination with human tuberculosis did not take place. Since his paper was written the trial findings have been published and the principals are convicted of negligence in permitting the possibility of just such contamination.

PERROT, S. A. The Present Status of BCG Vaccination. *New Eng. J. Med.*, 206, 9: 436 (Mar. 2), 1932.

**Venereal Disease Trends**—Two state-wide surveys of venereal disease incidence in 1927 and 1930 produced some interesting findings. The crude statistics indicate no change in the trend of gonorrhea and a slight increase in syphilis. Only 20 per cent of the physicians thought the diseases were increasing, and they believed this to be caused by moral laxity, prohibition, better diagnosis, ignorance, and uncontrolled prostitution. Those who thought the diseases to be decreasing gave as the reasons education, prophylaxis, better treatment, and clinics.

PFEIFFER, A., AND CUMMINGS, H. W. Syphilis and Gonorrhea in Up-state New York. *Am. J. Hyg.*, 15, 2: 459 (Mar.), 1932.

**Dissociation and the Staphylococcus**—*Staphylococcus albus*, *citreus* and *roseus* may be split off from *S. aureus*, and *aureus* in turn may be recovered again from *albus*. The authors find the *aureus* and *albus* strains essentially similar to S and R strains in other bacteria. Thus is another prop pulled out from under our shaky temple of bacteriological beliefs.

PINNER, M., AND VOLDRICH, M. Derivation of *Staphylococcus Albus*, *Citreus* and *Roseus* from *Staphylococcus Aureus*. *J. Infect. Dis.*, 50, 3: 185 (Mar.), 1932.

**Gas Appliance Ordinance**—Both the provisions of the Baltimore gas appliance ordinance and the problems concerned in its enforcement are discussed in detail.

SCHULTZE, W. H. The Baltimore Gas Appliance Ordinance and Its Relationship to Public Health. *J. Indust. Hyg.*, 14, 2: 41 (Feb.), 1932.

**Hemolytic Streptococci in Milk**—The term "*St. epidemicus*" cannot be used to designate the causative agent for septic sore throat, say these authors. Milk-borne sore throat and scarlet fever may be caused by one of several types of hemolytic streptococci.

WILLIAMS, A. W., *et al.* Milk-Borne Septic Sore Throat and Scarlet Fever and Their Relation to Beta Hemolytic Streptococci. *J. Bact.*, 23, 3: 241 (Mar.), 1932.

**More About Russia**—Among the very few unprejudiced glimpses we get into the Russian scene, this will be particularly interesting to health workers, for it has to do with social problems nearest to them.

WILLIAMS, F. E. Russia—A Nation of Adolescents. *Survey Graphic*, 46, 1: 9 (Apr. 1), 1932.

**Getting the Most Out of Health Examinations**—The school health examination becomes an educational ex-

perience when all the possibilities are realized in anticipation, preparation, examination and follow-up.

WILSON, C. C. Making the Health Examination an Educational Experience. *J. Health & Phys. Ed.*, 3, 3: 8 (Mar.), 1932.

**Communicable Disease Fatality Rates**—Case-fatality ratios less than these indicate incomplete reporting: diphtheria 15 to 19 cases to 1 death; measles 500 to 1; scarlet fever 100 to 1; typhoid fever 8 to 12 to 1; whooping cough 125 to 150 to 1. This is the conclusion of a Pennsylvania study.

WOOD, H. B. Case Fatality of Communicable Disease. *J. Prev. Med.*, 6, 2: 87 (Mar.), 1932.

## BOOKS RECEIVED

THE MODERN AMERICAN FAMILY. Edited by Donald Young. Philadelphia: American Academy of Political and Social Science, 1932. 253 pp. Price, \$2.50.

THE RHEUMATIC INFECTION IN CHILDHOOD. By Leonard Findlay. New York: Wood, 1932. 187 pp. Price, \$3.50.

MAN AND MICROBES. By Stanhope Bayne-Jones. Baltimore: Williams & Wilkins, 1932. 128 pp. Price, \$1.00.

MRS. ABRAHAM LINCOLN. By W. A. Evans. New York: Knopf, 1932. 364 pp. Price, \$4.00.

THE SEXUAL SIDE OF MARRIAGE. By M. J. Exner. New York: Norton, 1932. 252 pp. Price, \$2.50.

TEXTBOOK OF HUMAN PHYSIOLOGY. August Krogh. Philadelphia: Lea & Febiger, 1932. 233 pp. Price, \$2.75.

THE AETIOLOGY OF TUBERCULOSIS. By Dr. Robert Koch, translated by Dr. and Mrs. Max Pinner. New York: National Tuberculosis Association, 1932. 48 pp. Price, \$5.00.

PLAN AND TECHNIQUE OF DEVELOPING A PRISON INTO A SOCIALIZED COMMUNITY. By J. L. Moreno. New York: National Committee on Prisons and Prison Labor, 1932. 67 pp. Free.

NEW YORK SCHOOL CENTERS AND THEIR COMMUNITY POLICY. By Clarence Arthur Perry and Marguerita P. Williams. New York: Russell Sage Foundation, 1931. 78 pp. Price, \$5.00.

THE JUDD FAMILY. A Story of Cleanliness in Three Centuries. By Alice Mary Kimball and Mary Alden Hopkins. New York: Cleanliness Institute, 1931.

PRINCIPLES AND PRACTICES IN PUBLIC HEALTH NURSING INCLUDING COST ANALYSIS. Prepared by the National Organization for Public Health Nursing, Inc. New York: Macmillan, 1932. 129 pp. Price, 1.75.

AMERICAN SOCIETY OF MUNICIPAL ENGINEERS. Official Proceedings of the Thirty-Seventh Annual Convention, October 19-23, 1931. Vol. 37. St. Louis: American Society of Municipal Engineers, 1932. 855 pp. Price, \$7.50.

# NEWS FROM THE FIELD

## SUMMER SCHOOL COURSES IN PUBLIC HEALTH

*While the following list does not show all universities and technical schools offering summer courses in public health, it represents those who have replied to a questionnaire sent out by the American Public Health Association.*

*University of California, Berkeley, Calif.*

June 23–August 3

Administration of Schools of Nursing  
Elementary Epidemiology  
Elementary Public Health  
Public Health Nurse in Relation to the Community  
Responsibility of the Public Health Nurse for the Health of the Adult  
Elementary Supervision in Schools of Nursing  
Advanced Supervision in Schools of Nursing  
Biometry

*University of Chicago, Chicago, Ill.*

June 20–August 26

First Term: June 20–July 22

Second Term: July 25–August 26

Teaching the Principles and Practices of Nursing  
Supervision in Schools of Nursing  
Field of Public Health Nursing  
General Bacteriology  
Advanced Bacteriology, Parasitology, and Public Health  
Special Public Health Problems  
Preventive Medicine and Immunology  
Introduction to Nutrition and Dietaries  
Nutrition and Diet in Disease  
Clinical Nutrition  
Readings in Nutrition  
Child Care  
Child Development and Training  
Nutrition Work with Children  
Principles and Problems of Human Nutrition and Dietetics

*Columbia University—DeLamar Institute of Public Health, College of*

*Physicians and Surgeons, New York, N. Y.*

June 13–July 1

School Health Supervision—Medical Inspection, Mental Hygiene, and Physical Education

*Teachers College, New York, N. Y.*

July 5–August 12

Administration of Health Work in Schools  
Child Hygiene  
Health Care of Infants  
Health Education in Elementary Schools  
Health Problems in the Teaching of Fresh Air Classes  
Home and Community Hygiene  
Industrial Hygiene  
Methods of Teaching Lip-Reading  
Nutrition and Health  
Personal Hygiene  
Principles of Health Administration  
Principles of Public Health Nursing  
Public Health Administration  
Research in Child Health  
Safety Education  
School Nursing  
Sight Saving Classes  
Supervision in Public Health Nursing  
Supervision of Health Education  
Survey of Public Health Nursing

*Cornell University, Ithaca, N. Y.*

July 11–August 19

Gymnastics and Dancing  
Health Supervision of School Children  
Hygiene of the School Child and Adolescent  
Measurements of School Children  
Physical Education

*Duke University, Durham, N. C.*

June 14–July 22

Materials and Methods in Health Education  
Materials and Methods of Physical Education

*University of Georgia, Athens, Ga.*

June 13–August 13

Behavior Problems in Children  
Child Care and Training  
Child Development  
Child Study and Parent Education  
Development of the Young Child  
Diagnosis and Treatment of Exceptional Children  
Educational Biology  
Educational and Mental Hygiene  
Educational Hygiene  
Educational Sociology  
Health Education  
Mental and Educational Measurements  
Physiology and Health  
Play Activities  
P. T. A. and Parent Education  
Principles of Health and Recreation  
Mental Hygiene  
The Age of Adolescence  
The Age of Childhood

*Harvard University, Cambridge, Mass.*

July 6–August 16

Principles and Problems of Hygiene, and  
Teaching Methods  
Physical Education, Theory and Practice

*University of Hawaii, Honolulu, T. H.*

July, 1932

Public Health Nursing  
Child Hygiene  
Nutrition  
Public Health Administration

*University of Illinois, Urbana, Ill.*

June 20–August 13

Physical Education  
School Program of Physical Education  
Training Theory  
Health Education and Corrective Gymnastics  
Organization and Administration of Program in Physical Education for Elementary Schools

*Johns Hopkins University, Baltimore, Md.*

June 27–August 6

Elements of Hygiene and Preventive Medicine  
Child Health Problems

*Massachusetts Institute of Technology, Cambridge, Mass.*

July 5–August 12

Bacteriology

*Michigan State College, East Lansing, Mich.*

June 20–July 29

Bacteriology  
Hygiene  
Medical Biology  
Pathology  
Physiology

*University of Michigan, Ann Arbor, Mich.*

June 24–July 30

Child Welfare  
International and National Health Problems  
State Health Work  
Municipal Health Problems  
Descriptive Vital Statistics  
Advancements in Our Knowledge of Nutrition  
School Health Program  
Organization and Administration of Community Social Work  
County Health Work  
Control of Communicable Diseases  
The Role of the Laboratory in Public Health Work  
Principles and Practices of Epidemiology  
Methods and Materials in Health Education  
Dental Hygiene  
Mental Hygiene

*University of Minnesota, Minneapolis, Minn.*

June 13–August 27

Public Health

*University of Missouri, Columbia, Mo.*

June 13–August 5

Nursing  
Physical Education  
School Hygiene

*University of New Mexico*, Albuquerque,  
N. M.

June 6–July 30  
Educational Hygiene

*New York University*, New York, N. Y.

July 7–August 17  
Child Hygiene  
Education in Health  
Health and Growth of School Children  
Methods of Teaching Health  
Principles of Teaching Health

*Northwestern University*, Evanston, Ill.

June 20–August 13  
Personal Hygiene

*University of Pennsylvania*, Philadel-  
phia, Pa.

July 5–August 13  
Hygiene  
Physical Education

*Rutgers University*, New Brunswick,  
N. J.

June 27–August 5  
First Aid  
Preventive Medicine  
Public Health

*Stanford University*, Stanford Univer-  
sity, Calif.

June 23–September 3  
Health Department Administration  
Physical Education and Hygiene  
Public Health Nursing

*Syracuse University*, Syracuse, N. Y.

July 5–August 16  
Public Health Nursing  
Methods in Teaching Home Hygiene  
Courses  
Hygiene

*University of Virginia*, University, Va.

June 20–July 30 (First Term)  
August 1–September 3 (Second  
Term)  
Biochemistry  
Hygiene and Sanitation  
Physical Education  
Sex Character Education

*Vassar College*, Poughkeepsie, N. Y.

July 29–August 10  
Child Psychology  
Course for Nursery School Teachers  
Mental Hygiene  
Physiology and Nutrition  
Recreation  
Household Technology  
Food Selection, Preparation, and Service  
Problems of the Modern Family  
Parent Education Leadership

*University of Washington*, Seattle,  
Wash.

June 15–July 22 (First Term)  
July 25–August 25 (Second Term)  
Advanced Nutrition  
Bacteriology  
Health Education Movement  
Physical Education Methods  
Principles of Physical Education  
Administration of Public Health Nursing  
School Hygiene  
Supervision of Physical Education  
Principles in Health Education  
Foundations and Practices of Physical Edu-  
cation  
Euthenics in Mental Health

*University of West Virginia*, Morgan-  
town, W. Va.

June 13–July 22  
Public School Health

*Western Reserve University*, Cleveland,  
O.

June 20–July 29  
Foods and Health  
Hygiene of the Child  
Personal Hygiene  
Public Health Nursing  
Methods in Health Education  
Nursing Education to prepare graduate  
nurses for head nursing, administration,  
teaching, etc., in schools of nursing

*University of Wisconsin*, Madison, Wis.

June 27–August 5  
Bacteriology  
First Aid to the Injured  
Supervision and Administration of School  
Health  
Tests and Measurements in Physical Edu-  
cation  
Health Education in Schools

#### EDUCATION ASSOCIATIONS HEALTH SECTION TO MEET IN HONOLULU

THE Health Section Meetings of the Pacific Regional Conference of World Federation of Education Associations will be held in Honolulu, July 25-30, 1932. C. E. Turner, Dr.P.H., of the Massachusetts Institute of Technology, is Chairman. Subjects to be discussed include: Nutritional Needs in Relation to Racial and Climatic Conditions, The Health Examination of School Children, Play Activities in Relation to Health, and Health Training for Teachers. Summer courses in Health and Education will be given at the University of Hawaii in July.

This is an opportunity for participation in an international professional meeting, and for an ideal summer vacation. Special travel rates will be available. For further information write to the Secretary, Sally Lucas Jean, 200 Fifth Avenue, New York, N. Y.

#### SOUTHERN CALIFORNIA ASSOCIATION ELECTS OFFICERS

THE following officers were elected at the recent meeting of the Southern California Public Health Association: President, Wilson G. Knowlton; President-Elect, Dr. W. B. Wells; First Vice-President, Dr. Charles W. Decker; Second Vice-President, Dr. George H. Roth; Secretary-Treasurer, F. D. Sweger.

#### INTERNATIONAL ASSOCIATION OF ICE CREAM MANUFACTURERS

FRED RASMUSSEN, of Harrisburg, Pa., Executive Secretary of the International Association of Ice Cream Manufacturers for the last 7 years, died on February 21. He was 56 years of age, and a native of Denmark, but in 1912 he became a citizen of the United States. Mr. Rasmussen was Pennsylvania State Secretary of Agriculture 1919-1923.

During the War he had charge of work in connection with animal husbandry for the U. S. Food Administration in Pennsylvania and served later in the American Red Cross in France.

Robert C. Hibben, who has been with the Association as head of the Bureau of Service and Statistics for the past 6½ years, has been appointed Acting Executive Secretary.

#### SCHOOL LIFE IN PORTO RICO

MEALS at 1 cent each, payable in produce when cash is not available, are served every day to 50,000 children in the schools of Porto Rico. The meals are prepared and served by girl pupils as part of their school training.

Theodore Roosevelt, in his last written review of education in Porto Rico, before his recent appointment by President Hoover to the governorship of the Philippine Islands, cites this as one of the many methods used in Porto Rico to "disseminate practical knowledge." —*School Life*, official organ of the Office of Education, U. S. Dept. of the Interior.

#### 50,000 SCHOLARSHIPS IN UNITED STATES

INFORMATION regarding scholarships and fellowships available at institutions of higher learning in the United States, which is of vital interest to many thousands of students who need financial assistance to enable them to complete their education, is contained in a new bulletin of the Federal Office of Education, 1931, No. 15, price 30 cents, available from the Superintendent of Documents. The publication, prepared by Ella B. Ratcliffe, chief educational assistant in the division of colleges and professional schools, lists the scholarship offerings at 402 colleges and universities. More than 50,000 scholarships and fellowships are available annually in the United States, it is estimated. The total money value of the grants is approximately \$10,000,000.

## THE LUEBECK DISASTER

IN our issue of March, 1932, we gave the decision of the court concerning the Luebeck disaster finding that Drs. Deycke and Alstaedt were guilty of homicide and sentenced to prison, one for 2 years and the other for 15 months. Most recent reports say that the case has been appealed. The result will be awaited with interest. The sympathy of everyone goes out to Dr. Deycke and his assistants, and we cannot help hoping that some amelioration may be granted on their appeal.

## PERSONALS

DR. JOHN B. DERRICKSON, of Frederica, Del., has been appointed director of the Sussex County Health Unit, with headquarters at Georgetown, Del.

DR. HYMAN I. SPECTOR, member A. P. H. A., of St. Louis, Mo., who resigned 6 years ago as tuberculosis controller for the city, has been reappointed to that position, to succeed the late Dr. Howard H. Bell.

DR. ROBERT R. ELLIS, of Kirksville, Mo., has been appointed deputy state Health Commissioner for a term of 3 years.

DR. JACOB L. MORENO has been appointed Consultant in Psychiatry and Criminology by the Board of Directors of the National Committee on Prisons and Prison Labor.

DR. JUNIUS B. HARRIS, of Sacramento, Calif., and Gifford L. Sobey, of Paso Robles, Calif., were recently appointed members of the California Department of Public Health, to succeed Drs. Robert A. Peers and Fred F. Gundrum, whose terms expired.

DR. FINIS C. SUGGETT, member A. P. H. A., of Columbia, Mo., is the new director of the Des Moines, Ia., County Health Unit. He succeeds Dr. Carl F. Jordan, who is returning to the University of Iowa as assistant professor of hygiene and preventive medicine.

## CONFERENCES

May 9-10, American Association of Medical Milk Commissions, and the Certified Milk Producers' Association of America, New Orleans, La.

May 14, Texas Beach and Pool Association, Fourth Annual Short School, Dallas, Tex.

May 10-15, Annual Congress of The Royal Institute of Public Health, Belfast, Ireland.

May 12-13, Annual Pennsylvania State-wide Safety Conference, Harrisburg, Pa.

May 15-21, National Conference of Social Work, Philadelphia, Pa.

May 20-21, National Advisory Health Council of the National Institute of Health, Washington, D. C.

May 25-27, The Canadian Public Health Association, 21st Annual Meeting, in association with Ontario Health Officers' Association, Toronto, Ont.

June 2-3, State and Provincial Health Authorities of North America, Washington, D. C.

June 2-3, State and Territorial Health Officers Conference, Washington, D. C.

June 6-9, National Tuberculosis Association, Colorado Springs, Colo.

June 9-11, Third Annual Meeting, Western Branch, American Public Health Association, Denver, Colo.

July 9-16, Royal Sanitary Institute, Brighton, England.

July 21-29, 100th Anniversary Meeting, British Medical Association, London.

July 25-30, Regional Conference of the World Federation of Education Associations, Honolulu, Hawaii.

July, 1932, The Second International Conference of Social Work, Frankfurt.

October 24-27, 61st Annual Meeting, American Public Health Association, Washington, D. C.

# American Journal of Public Health

## and THE NATION'S HEALTH Vol. XIV No. 6

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Number 6

### Physical Impairment Among One Thousand Negro Workers\*

FLOYD P. ALLEN, M. D., F. A. P. H. A.

*Public Health Federation, Cincinnati, O.*

TWO years ago at the annual meeting of the Industrial Hygiene Section, we presented a summary of our findings dealing with the first of a series of Life Conservation Studies: Physical Impairment among 1,000 White Male Office Workers.<sup>1</sup> Last year we reported before this section on the second group in this series under the title: A Report on 1,000 Physical Examinations of (White) Machine and Hand Tool Operators.<sup>2</sup> In the interim a third group: 1,000 Negro Factory Workers, has been examined. We are presenting in this report some of the more important findings derived in the study of the negro factory workers group.

Procedures attending examinations and subsequent steps in tabulating data for the 3 groups have been followed with a minimum of variation in order that the findings might be trustworthy of comparison. As these studies have progressed, a few items have been added to the physical examination schedule each year, but the basic standards for physical measurements and defections<sup>†</sup> have been precisely followed throughout the series.

The circumstances under which the present study was undertaken were somewhat different from those of either of the preceding ones. It was the outcome of particular concern on the part of the Public Health Federation and the Anti-Tuberculosis League of Cincinnati in the health of the negro. These organizations, desiring to learn more

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\* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 16, 1931.

<sup>†</sup> See *Statistical Report* for plan and purposes of the Life Conservation Series. Standards will be found in Appendix II of statistical report. Copies of this report may be obtained from the Heart Council, 312 West Ninth Street, Cincinnati, O.



about the health of the negro in industry and seeing through the Heart Council's Life Conservation Series an opportunity for scientific study, decided to coöperate in conducting the examinations of 1,000 negro men in industry through the Heart Council.

The group under consideration comprised 1,032 negro men all of whom voluntarily submitted themselves for examination. They were drawn from the rank and file of those employed in the manufacture of metal products, roofing, cotton products, chemical fertilizer, leather goods, and glass products. Thirteen factory groups in the Cincinnati metropolitan area were included in this survey. Our only requirement of examinees was that they be 20 years of age or over.

We have been particularly interested in determining through this series of studies factors involved in the heart disease situation common to later years of life. It has been our desire, therefore, to select a large proportion of men past 40 years in each group. In the clerical group only did we succeed to any extent. Here three-fourths of the men were between 30 and 55. In the white industrial workers group, on the other hand, three-fourths of the men were under 45, and in the negro factory workers group, more than three-fourths (79.8 per cent) were under 45. In spite of our efforts to include older men in these groups, we failed for the reason that they are not to be found in large numbers in industrial work in Cincinnati.

#### GENERAL CONSIDERATIONS

In order that the findings may be given a proper background, it is worthwhile to consider briefly some of the social, economic, and health aspects of negro life in Cincinnati. The negro industrial worker, like others employed in industry, spends two-thirds of his time in an environment common to other members of his family, and it is to this period, aside from working hours, that we must charge many of the ills that befall him.

In the last 10 years Cincinnati's negro population has increased from 7 to 11 per cent, due in large proportion to an influx from southern states. Practically none come to jobs awaiting them; they must seek employment, and the wage scale of those employed is in general low. A considerable number of negroes are to be found idle at any time. Fully 90 per cent are sheltered under conditions of over-crowding with meager facilities for sanitation and comfort. Most of their small earnings are spent for foods and luxuries. Many exist on grossly imbalanced diets, and even though a family of 5 may be living in one room, a radio will usually be found among the furnishings and a dilapidated automobile somewhere near the dwelling. Clothing is often in-

adequate to protect against the cold and dampness. Medical attention is usually sought as a means of cure rather than prevention, even though clinic facilities are accessible either without cost or for a small fee.

The average negro is a care-free sort of person who gives little thought to the future so long as he feels well, has plenty to eat, a place of shelter, and can indulge in the social life of his choice. It is in all likelihood this method of living, with little thought of restraint and less concern about the ill-effects, that accounts for the inception of many of the physical ills to which negroes fall heir. From what information we have been able to gather, we are inclined to believe that with a knowledge and effective application of personal hygiene in a favorable environment, this race can materially lower its morbidity and mortality rates to the point where they will compare favorably with those of the white population. It is not likely, in our opinion, that racial susceptibility or some other unidentified factor can account for excessive morbidity and mortality rates among negroes from certain well known causes.

The mortality experience from tuberculosis during 1930 in two contiguous census tracts in Cincinnati, each with a considerable negro population, shows an interesting contrast. In tract 36, in the group of 4,131 negroes of a poor class, the mortality rate from tuberculosis was 290 per 100,000 population. In tract 37, there were no deaths from tuberculosis among its negro population of 1,763, which is made up of the highest class of negroes in the city.

As a further example, by way of contrast, let us compare the mortality rates for certain principal causes during 1930 among a poor class of whites in tract 5, with those for a high class of negroes in census tract 37:

TABLE I

MORTALITY RATES IN 1930 FOR WHITE POPULATION IN CENSUS TRACT 5, AND FOR  
COLORED POPULATION IN TRACT 37, CINCINNATI

	White rates, Tract 5 per 100,000	Col. rates, Tract 37 per 100,000
Tuberculosis (all forms) .....	673	0
Cardiovascular diseases .....	300	965
Pneumonia .....	224	170
Cancer .....	75	340
Apoplexy .....	150	170
Nephritis .....	139	170
Deaths under 1 year per 1,000 live births ...	172.4	71.4
Diarrhea and enteritis under 1 year per 1,000 live births .....	103.5	35.2

In Table I it will be noted that mortality rates for diseases common

to older age groups are consistently higher for negroes. On the other hand, rates for causes more common to or exclusively among younger age groups are notably lower for negroes. There is in this experience an indication that, through more favorable conditions of living and through proper enlightenment, mortality among negroes can be materially lowered.

#### EXAMINATION FINDINGS—1,000 NEGRO WORKERS

Those negroes drawn for purposes of our study out of the mass employed in Cincinnati industries represent in the main the poorer classes. In the course of examining these men we anticipated that in the aggregate a high per cent of physical defection would be found. Actually, only 1 out of the 1,000 men was considered to be essentially free of physical defects. To many a physical examination was a new experience. The striking fact was that out of 999 men with defects, only 8 knew or admitted knowing of their existence prior to the examination. In the opinion of the examiners, 911 of the group would profit by early medical care. For purposes of summarizing, physical defects were classed as major or minor.\* Examinees with major defects outnumbered those with minor nearly 10 to 1. Among those 25 years of age and under, 87.5 per cent had major physical defects which increased in frequency up to 50 years. Beyond 50 years, all men examined were found to have major physical defects.

Space will not permit entering into the discussion of all the items listed in the tabulation of physical findings. We shall therefore consider only those dealing with cardiovascular lesions and correlations, and pulmonary findings.

#### CARDIOVASCULAR LESIONS

One of the most striking situations in the group of 556 men with significant cardiovascular abnormalities was the high incidence of hypertension, 249, a conspicuous number of whom were under 40. Up to 30 years, 13.8 per cent of all men examined, and between 30 and 40, 21.5 per cent had elevated blood pressures. The curve by age for incidence of hypertension in this group is higher for men over 30 years than those based on insurance statistics and on findings in other similar surveys that have come to our attention. Second readings on a fair sample of examinees (120) previously found to have elevated blood pressures gave when correlated with first readings a fairly high index of reliability of the initial records, viz.,  $0.717 \pm 0.03$  as the probable error.

TABLE II

SUMMARY OF PHYSICAL FINDINGS—1,000 NEGRO FACTORY WORKERS

	No. involved
Weight	
10 lb. or more overweight .....	358
10 lb. or more underweight .....	275
Vision	
20/30 or more in one or both eyes .....	508
Dental defects .....	787
Defective hearing .....	107
Enlarged thyroid .....	39
Significant cardiovascular lesions .....	556
Cardiac enlargement .....	249
Valvular lesions .....	125
Myocardial insufficiency .....	68
Hypertension .....	249
Hypotension .....	119
Arteriosclerosis (marked) .....	11
Pulmonary defects .....	82 *
Hernia .....	147
Hemorrhoids .....	147
Dermatoses .....	212
Flat feet .....	816
Traumatic deformities, extremities .....	22
Albuminuria .....	170
Glycosuria .....	4
Wassermanns positive .....	300 †

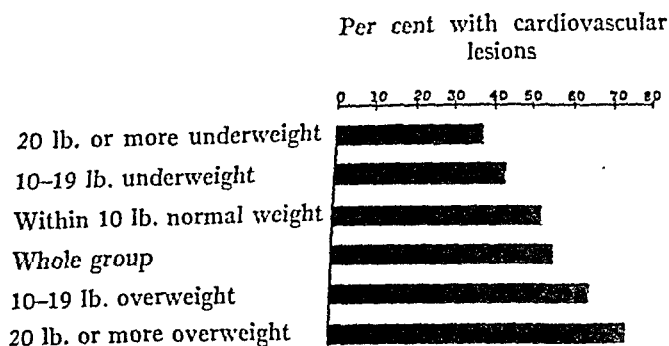
\* Findings incomplete.

† Estimated on basis of 83 positives (+++ and ++++) out of 362 Wassermanns obtained.

*Weight and Cardiovascular Lesions*—In our Life Conservation Series totalling thus far 3,000 men, there has been a consistently greater incidence of cardiovascular impairment among those overweight. In the negro group, this relation is shown in Figure I. In this group,

FIGURE I

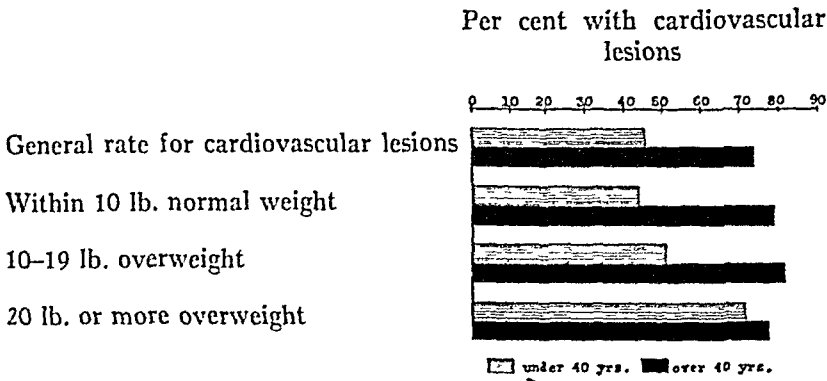
WEIGHT AND CARDIOVASCULAR ABNORMALITIES  
IN  
1,000 MALE NEGRO FACTORY WORKERS



among men under 40 years, the greater the amount of overweight, the higher the incidence of cardiovascular abnormalities found—as re-

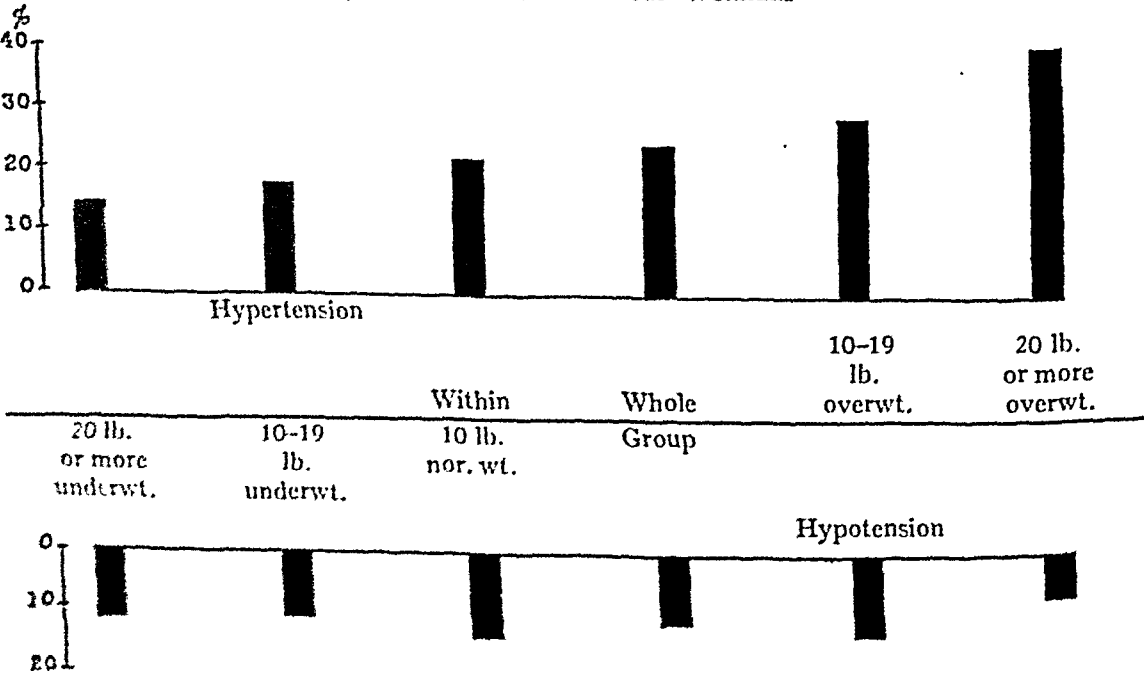
vealed in Figure II. Over 40 years there appeared to be little relation between weight status and cardiovascular abnormalities.

FIGURE II  
OVERWEIGHT AND CARDIOVASCULAR ABNORMALITIES  
IN  
1,000 NEGRO MALE FACTORY WORKERS  
UNDER AND OVER 40 YEARS



Again it was observed, as in the previous two groups, that hypertension existed among more men who were overweight than among those of other weight status. Of examinees 20 lb. or more underweight, 14.8 per cent had elevated blood pressures, 22 per cent within 10 lb. of normal weight were similarly involved, while of those 20 lb. or more overweight, 39.5 per cent were found with high blood pres-

FIGURE III  
WEIGHT AND ABNORMAL BLOOD PRESSURES  
IN  
1,000 MALE NEGRO FACTORY WORKERS



tures. The incidence of abnormal blood pressures and weight status is shown in Figure III.

*Urine Findings and Cardiovascular Lesions*—Not only have these relations between overweight and cardiovascular lesions been noted, but the incidence of albuminuria has been consistently higher among men with cardiovascular lesions. The frequency with which albuminuria was determined for the negro group was notably high.

TABLE III  
ALBUMINURIA AND CARDIOVASCULAR LESIONS  
IN  
3,000 MALE INDUSTRIAL WORKERS

Groups Examined	Rate per 1,000 with Albuminuria among those:	
	With no cv. lesions	With cv. lesions
I. White clerical workers .....	1.4	2.5
II. White machine and hand tool operators .....	3.6	6.1
III. Negro factory workers .....	13.4	20.0

The outstanding communicable disease problem among Cincinnati negroes is tuberculosis, which led all other causes of death during 1930. Of all colored deaths from tuberculosis in this period, 22 per cent occurred under and 78 per cent over 20 years of age. Tuberculosis is not only claiming more victims past 20 years than formerly, but the highest incidence of mortality is advancing into age groups around 40 years.

It might be surmised that the incidence of tuberculosis in male negro labor groups would be low because few with the disease could long endure the physical strain, but this disease does exist to an appreciable extent among this type of workers. The Anti-Tuberculosis League of Cincinnati has completed chest X-ray examinations upon 280 negro factory workers and in 2 definite evidence of active tuberculosis was revealed, while in 11 others the disease was suspected—an incidence of 7 per 1,000 with active tuberculosis, and 39 per 1,000 suspected of having the disease. Below 40, the X-ray revealed 31.5 per cent of the 280 men with some form of pulmonary pathology, and over 40 years 43 per cent were involved. The average age where tuberculosis was either found or suspected was 37 years.

This study is at present limited. The Anti-Tuberculosis League hopes to increase the series of X-rays to involve at least 500 of the men originally examined. From what has been learned in our contact with negroes, with this group as a whole and the roentgenologic studies of it in part, we believe that tuberculosis must not be overlooked as a source of physical impairment in dealing with the industrially employed negro.

GENERAL COMMENT

Among 1,000 male negro industrial workers, only 1 was found to be essentially free of physical defects, and for the remainder, major defects predominated. In view of this situation, we wonder how these men can endure moderate to great amounts of physical effort exacted of them. As a matter of fact, many do not long endure; they suffer physical breakdown relatively early in life. Even now the toll is so great among these people from tuberculosis, syphilis and the degenerative diseases that comparatively few reach old age.

Our experience thus far shows that the ratio of rates for cardiovascular lesions between white and colored men examined bears a close relation to the ratio of local mortality rates between the two races. In our studies I and II, we found that 33.5 per cent of the two groups had significant circulatory defects, while in the negro group 55.6 per cent were involved. This means that the colored rate was 1.6 times the white. The general mortality rate from circulatory diseases over a 10-year period ending 1929 averages for negroes 1.7 times that for whites. In 1930, the year during which this study was made, we find an even closer correlation in the incidence of these rates:

RATES PER 1,000 MALES OVER 20 YEARS FOR CARDIOVASCULAR LESIONS FOUND IN 3,000 EXAMINED MEN AND MORTALITY RATES FROM CARDIOVASCULAR DISEASES PER 1,000 MALE POPULATION OVER 20 YEARS IN CINCINNATI DURING 1930

	Mortality per 1,000	Cardiovascular lesions per 1,000 examined
White .....	33.0	33.5
Colored .....	55.9	55.6

In general it may be predicted, on the basis of this survey and other information, that a very large amount of physical impairment probably exists in the negro race. Moreover, the small sample on which our observations have been based shows a considerable amount of significant physical impairment in male labor groups under 40.

This situation is not without hope of improvement. We find in the recent mortality records of small groups of negroes in a higher economic class, and in favorable environment, an indication of definite improvement. Morbidity and mortality rates among negroes can, we believe, be lowered to the point where they will compare favorably with those for whites. This may eventually come to pass, but there will be many social, economic, and health problems to be dealt with in realizing the accomplishment.

# Effect of Lead Arsenate Spray on the Composition and Vitamin Content of Oranges\*

E. M. NELSON, PH. D., AND H. H. MOTTERN

*Bureau of Chemistry and Soils, U. S. Department of Agriculture,  
Washington, D. C.*

GRAY and Ryan<sup>1</sup> in California, and Juritz<sup>2</sup> in South Africa, in studying the effect of arsenic sprays on oranges found a marked reduction of acidity in the ripe fruit. Juritz also found a diminution of sucrose from 4.14 to 1.12 gm. per 100 c.c. of juice in heavily treated trees, total sugar changing only from 9.77 to 7.26 gm. per 100 c.c. of juice. In 1927 Hawkins and Barger<sup>3</sup> reported that they had confirmed the results of Gray and Ryan and stated that in 1893 it was reported to the Florida State Horticultural Society that spraying with a mixture of bisulphate of soda and arsenate of lime would produce a sweet orange.

Yothers<sup>4</sup> showed that the change in composition of the fruit is altered by a single spraying at or shortly after blossoming time. Notwithstanding the fact that the change in the chemical composition of the fruit was definitely established 10 years ago, there have been no thorough investigations dealing with the function of arsenic in bringing about a deranged metabolism of the plant. Recently Copeman, on the basis of chemical evidence, has postulated that lead arsenate appears to produce a selective oxidation in which the citric acid is oxidized in preference to cell wall material.

It seemed desirable to obtain further information with respect to the extent of chemical changes produced by different degrees of spraying and to ascertain if spraying had any effect on vitamin content of the fruit. The extensive use of arsenical sprays to prevent insect infestation in Florida at the time this work was planned made these investigations advisable. To prevent spread of the Mediterranean fruit fly into uninfested areas certain fruits were subjected to a method of processing under supervision of the Plant Quarantine and Control Ad-

\* Read before the Food, Drugs and Nutrition Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 15, 1931.



TABLE I  
CHEMICAL ANALYSIS OF NORMAL FRUIT, NOT SPRAYED, NOT PROCESSED  
LOT 1

	Weight of Orange	Volume of Juice	Per Cent Juice	Soluble Solids (Brix)	Acidity as An- hydrous Citric Acid	Ratio Brix Acidity	Per Cent Acid in Fruit	pH Value
As received	gm.	c.c.	%	%	%		%	
	291	173	59.5	11.0	0.94	11.7	0.583	3.6
	298	154	51.7	11.2	1.12	10.0	0.610	3.4
	250	163	65.2	11.6	0.88	13.2	0.636	3.6
	213	130	61.0	10.9	0.81	13.5	0.512	3.8
	222	122	55.0	11.5	1.02	11.3	0.589	3.5
	260	155	59.6	11.5	1.04	11.1	0.656	3.5
	248	152	61.3	11.2	0.97	11.5	0.666	3.6
	253	151	59.7	11.0	0.84	13.1	0.525	3.7
	221	115	52.0	11.8	0.78	15.1	0.426	3.6
	242	147	60.7	11.6	1.00	11.6	0.637	3.5
Average	250	146	58.6	11.3	0.94	12.2	0.584	3.6
After 30 days Storage	237	123	51.9	12.6	0.98	12.9	0.535	3.8
	248	127	51.2	12.7	1.00	12.7	0.538	3.7
	264	157	59.5	11.7	0.99	10.8	0.619	3.7
	225	128	56.9	12.3	1.00	12.3	0.597	3.8
	224	111	49.6	13.3	0.99	13.4	0.516	4.0
	329	172	52.3	11.5	0.85	13.5	0.465	3.8
	224	128	57.1	11.9	1.01	11.8	0.605	3.6
	280	160	57.1	11.9	0.90	13.2	0.542	3.7
	270	122	45.2	11.7	0.94	12.4	0.447	3.8
	262	142	54.2	12.0	0.84	14.3	0.477	3.9
Average	256	137	53.5	12.2	0.95	12.7	0.534	3.8
After 60 days Storage	215	108	50.2	11.5	0.90	12.8	0.477	3.7
	235	134	57.0	12.4	1.04	11.9	0.627	3.6
	183	100	54.6	12.4	0.80	15.5	0.459	3.7
	248	147	59.3	11.9	1.02	11.7	0.635	3.6
	239	138	57.7	12.3	1.03	11.9	0.623	3.7
	220	126	57.3	12.3	1.12	11.0	0.676	3.7
	219	107	48.9	12.9	1.04	12.4	0.533	3.7
	260	134	51.5	13.2	0.92	14.3	0.500	3.8
	222	130	58.6	11.9	0.97	12.3	0.598	3.7
	264	156	59.1	12.2	0.90	13.6	0.561	3.7
Average	231	128	55.4	12.3	0.98	12.7	0.569	3.7

ministration. It also seemed desirable to ascertain what effect, if any, this treatment might have on the chemical composition and vitamin C content of oranges.

#### CHEMICAL INVESTIGATION

For the first set of experiments, samples of heavily sprayed, medium sprayed, and unsprayed Florida Valencia oranges, both processed

TABLE II  
CHEMICAL ANALYSIS OF NORMAL FRUIT, NOT SPRAYED, PROCESSED  
Lot 2

	Weight of Orange	Volume of Juice	Per Cent Juice	Soluble Solids (Brix)	Acidity as An- hydrous Citric Acid	Ratio Brix Acidity	Per Cent Acid in Fruit	pH Value
As received	gm.	c.c.	%	%	%		%	
	230	107	46.5	11.1	1.04	10.7	0.502	3.5
	263	136	51.7	11.6	0.92	12.6	0.496	3.7
	176	84	47.7	11.2	1.00	11.2	0.501	3.6
	205	105	51.2	11.7	1.08	10.8	0.584	3.6
	169	86	50.9	11.3	1.01	11.2	0.540	3.6
	238	133	55.9	11.1	1.03	10.8	0.598	3.7
	248	125	50.4	10.5	0.92	11.4	0.484	3.6
	226	128	56.6	10.2	0.89	11.5	0.526	3.6
	234	121	51.7	11.0	0.81	13.6	0.434	4.0
	276	123	44.6	10.6	0.86	12.3	0.526	3.8
Average	227	115	50.7	11.0	0.96	11.6	0.519	3.7
After 30 days Storage	234	105	44.9	11.2	0.59	19.0	0.278	4.0
	294	148	50.3	11.2	0.69	16.2	0.367	4.1
	296	156	52.7	11.1	0.95	11.7	0.522	3.7
	279	126	45.2	12.1	0.96	12.6	0.456	3.6
	332	178	53.6	10.1	0.60	16.8	0.332	4.0
	255	105	41.2	11.7	0.74	15.8	0.321	3.8
	242	133	55.0	11.4	0.78	14.6	0.451	3.9
	261	149	57.1	11.4	0.88	13.0	0.531	3.8
	241	121	50.2	11.9	0.86	13.8	0.457	3.8
	241	130	53.9	10.8	0.74	14.6	0.415	3.9
Average	268	135	50.4	11.3	0.78	14.8	0.413	3.9
After 60 days Storage	245	120	49.0	11.1	0.71	15.6	0.363	3.9
	239	124	51.9	11.9	0.75	15.9	0.410	3.9
	212	111	52.4	12.0	0.80	15.0	0.440	3.8
	255	126	49.4	11.4	0.76	15.0	0.395	3.8
	239	115	48.1	11.9	0.66	18.0	0.337	3.9
	239	129	54.0	11.5	0.66	17.4	0.378	4.0
	238	111	46.6	11.3	0.69	16.4	0.340	3.9
	228	123	53.9	11.8	0.86	13.7	0.485	3.8
	227	116	51.1	11.8	0.74	15.9	0.399	3.8
	204	97	47.5	11.2	0.66	17.0	0.328	3.9
Average	233	117	50.4	11.6	0.73	17.5	0.388	3.9

and unprocessed, were received from the Bureau of Plant Industry, Orlando, Fla. These were from the same orchard, and treatment had been similar except as above mentioned. The processing was carried out in accordance with the regulations of the Plant Quarantine and Control Administration and consisted of heating the fruit to 110° F. for a period of 8 hours in order to destroy larvae of the Mediterranean

TABLE III  
CHEMICAL ANALYSIS OF MEDIUM SPRAYED FRUIT, NOT PROCESSED  
LOT 3

	Weight of Orange	Volume of Juice	Per Cent Juice	Soluble Solids (Brix)	Acidity as An- hydrous Citric Acid	Ratio Brix Acidity	Per Cent Acid in Fruit	pH Value
As received	gm.	c.c.	%	%	%		%	
	190	115	60.5	11.1	0.16	69.4	0.103	5.3
	193	111	57.5	12.3	0.32	38.4	0.196	4.7
	174	105	60.3	11.9	0.24	49.6	0.151	5.0
	187	107	57.2	11.9	0.28	42.5	0.166	4.6
	178	107	60.1	12.2	0.21	58.1	0.132	5.1
	192	115	59.9	10.5	0.19	55.3	0.120	5.2
	180	108	60.0	10.9	0.12	90.8	0.078	5.4
	171	107	62.6	11.0	0.17	64.7	0.113	5.2
	180	108	60.0	10.5	0.17	61.8	0.108	5.2
	177	106	59.9	10.8	0.42	25.7	0.264	4.8
Average	182	109	59.9	11.3	0.23	55.6	0.144	5.1
After 30 days Storage	171	85	49.7	11.6	0.22	52.7	0.114	5.0
	184	112	60.9	11.5	0.40	28.8	0.256	4.5
	208	123	59.1	11.0	0.22	50.0	0.136	5.0
	173	104	60.1	12.0	0.27	44.4	0.168	4.8
	173	105	60.7	11.2	0.28	40.0	0.176	4.7
	206	123	59.7	11.0	0.37	29.7	0.233	4.4
	191	116	60.7	10.4	0.52	20.2	0.328	4.1
	183	108	62.4	10.9	0.48	22.7	0.312	4.2
	178	105	59.0	11.0	0.19	57.9	0.118	5.0
	172	103	59.9	11.0	0.29	37.9	0.180	4.8
Average	184	108	59.2	11.2	0.32	38.4	0.202	4.7
After 60 days Storage	191	98	51.3	11.6	0.17	68.2	0.092	5.1
	151	84	55.6	11.9	0.18	66.1	0.106	5.0
	166	92	55.4	10.9	0.12	90.8	0.072	5.2
	171	94	55.0	11.5	0.17	67.6	0.099	5.0
	180	102	56.7	11.4	0.14	81.4	0.085	5.1
	154	92	59.7	11.7	0.10	117.0	0.066	5.4
	150	88	58.7	11.7	0.15	78.0	0.094	5.1
	145	85	58.6	11.6	0.15	77.3	0.094	5.1
	195	113	57.9	10.5	0.42	25.0	0.255	4.2
	125	83	66.4	12.0	0.16	75.0	0.113	5.0
Average	163	93	57.5	11.5	0.18	74.6	0.108	5.0

fruit fly. These samples upon receipt were placed in storage at 40° F. and examined at that time and 30 and 60 days later.

As individual oranges vary somewhat in acid and sugar content, 10 fruits of average size and apparent degree of ripeness were selected from each lot, individually weighed, halved, the juice extracted and measured, and then filtered through 2 thicknesses of cheesecloth.

Soluble solids were determined by specific gravity and converted to degrees Brix. Acidity was determined by titrating 10 c.c. of the juice of each orange with standard alkali and the results were expressed as per cent anhydrous citric acid. The pH was determined electrometrically by the quinhydrone electrode. A composite sample of equal amounts of juice from each fruit was used for the sugar determinations. Sugars were determined by reduction of Fehling's solution, before and after inversion, the cuprous oxide being weighed, and the quantity of sugars present calculated with the aid of Munson and Walker's table and recorded as grams per 100 c.c.

The results of analyses made on the individual fruits are given in Tables I to VI. These show that there is a marked reduction in acidity of sprayed fruit. Heavily sprayed fruit has an acidity of about one-fifth of the normal, and medium sprayed about one-fourth. There is also a reduction in sucrose with a corresponding increase in invert sugar, the total sugar remaining the same. No changes due to processing were found on arrival of the shipment, nor did any develop on 60 days' storage.

One year later analyses were made on a second set of spray-treated fruit (Lots 7 to 10), Table VIII. All results given in this table were obtained from a composite sample made from the juice of 10 fruits. Lots 8, 9, and 10 were from the same orchard. Lot 7 was unsprayed fruit of the same variety but from a different orchard. Lot 8 had received approximately the same spray treatment as Lot 9 received the previous year, but no spray treatment during the current year of growth and ripening. This lot shows an almost complete recovery as indicated by the acidity and the Brix acidity ratio. The ratio of sucrose to total sugar given in the last column of this table shows the decline in sucrose according to the severity of the spray treatment. Lot 9 came from trees which had received a medium spray treatment in 1929 and in 1930, and Lot 10 was obtained from trees heavily sprayed both years. These lots show the same characteristics as Lots 3 and 5, respectively. There is a decrease in acidity with a corresponding increase in pH value and an increase in invert sugar at the expense of sucrose.

Samples of the juice and pulp from the heavily sprayed and unsprayed oranges were examined for arsenic by the Gutzeit method, but this was not present in more than the mere traces present in most food products.

Since there was a significant difference in the pH value, the effect of the juice from sprayed and unsprayed fruit was tried upon congo red paper. It was found that all the unsprayed fruit gave an acid re-

action against about 1 of 10 of the sprayed. The juices affecting congo red paper had an acidity of 0.4 per cent or greater, corresponding to a pH value of 4.4 or less. The reaction of the juice to congo red paper suggests a simple way of testing for reduced acidity in oranges due to spraying.

The total ash of sprayed and unsprayed fruit was 0.43 gm. per 100

TABLE IV  
CHEMICAL ANALYSIS OF MEDIUM SPRAYED FRUIT, PROCESSED  
LOT 4

	Weight of Orange	Volume of Juice	Per Cent Juice	Soluble Solids (Brix)	Acidity as An- hydrous Citric Acid	Ratio Brix Acidity	Per Cent Acid in Fruit	pH Value
As received	gm.	c.c.	%	%	%		%	
	156	81	51.9	11.3	0.35	32.3	0.192	4.4
	170	100	58.8	11.3	0.16	70.6	1.100	5.0
	183	102	55.7	11.2	0.16	70.0	0.095	5.1
	178	95	53.4	11.0	0.32	34.4	0.176	4.6
	177	93	52.5	11.5	0.55	20.9	0.305	4.3
	169	93	55.0	11.2	0.21	53.3	0.121	4.9
	166	97	58.4	10.6	0.23	46.1	0.140	4.8
	150	89	59.3	11.7	0.35	33.4	0.219	4.5
	150	89	59.3	11.6	0.18	64.4	0.113	5.1
	162	89	54.9	10.7	0.23	46.5	0.132	4.8
Average	166	93	55.9	11.2	0.28	47.1	0.159	4.8
After 30 days Storage	155	82	52.9	11.7	0.16	73.1	0.090	5.3
	174	100	57.5	11.4	0.27	42.2	0.161	4.8
	185	103	55.7	10.4	0.16	65.0	0.095	5.2
	175	94	53.7	11.0	0.16	68.8	0.091	5.3
	180	101	56.1	10.9	0.27	40.4	0.157	4.8
	224	120	53.6	10.9	0.16	68.1	0.091	5.2
	192	114	59.4	12.0	0.56	21.4	0.350	4.1
	200	95	46.3	9.8	0.22	44.5	0.106	4.9
	231	136	58.9	10.9	0.17	64.1	0.106	5.1
	196	117	59.7	11.1	0.12	92.5	0.078	5.5
Average	191	106	55.4	11.0	0.23	58.0	0.133	5.0
After 60 days Storage	185	83	44.9	11.0	0.19	57.9	0.090	4.8
	154	75	48.7	10.2	0.17	60.0	0.088	5.0
	176	92	52.3	9.8	0.17	57.6	0.094	4.9
	166	86	51.8	10.4	0.20	52.0	0.109	4.8
	190	106	55.6	10.2	0.16	63.8	0.095	5.1
	159	89	56.0	11.4	0.16	71.3	0.095	5.0
	173	81	48.6	11.5	0.19	60.5	0.097	4.9
	199	107	53.8	10.0	0.15	66.7	0.086	5.2
	202	117	57.9	11.2	0.15	74.7	0.093	5.0
	186	96	51.6	11.9	0.22	54.1	0.119	4.9
Average	179	94	52.1	10.8	0.18	61.9	0.097	5.0

c.c. of juice in both. The alkalinity of the ash was the same in both—the ash from 100 c.c. of juice neutralized 44 c.c. of tenth-normal acid.

#### BIOLOGICAL INVESTIGATIONS

The marked effect of lead arsenate spraying upon the chemical composition of orange juice and consequent changes in the metabolism of the plant suggested the possibility of a change in vitamin C content. The feeding of orange juice to infants, particularly those artificially fed, is a well established practice, and it is therefore very desirable to know if any appreciable variation in the vitamin C content of oranges exists. Experiments were conducted on some of the fruit used in chemical analyses. Young guinea pigs, weighing with some exceptions from 275 to 300 gm., were kept in individual cages and fed a ration of rolled oats, 69 parts; alfalfa meal (autoclaved  $1\frac{1}{2}$  hours at 15 lb. pressure), 25 parts; commercial casein, 5 parts; sodium chloride, 1 part. The desired dose of orange juice was fed daily with a pipette. The animals were weighed twice a week and observations of their condition recorded at each weighing or oftener.

Three experiments were conducted, 2 in the winter of 1930, on different levels of the same orange juice and 1 in the winter of 1931. The first experiment was with 1 c.c. of orange juice per day from fruit that had not been sprayed (Lots 1 and 2), and from fruit of trees sprayed heavily with lead arsenate (Lots 5 and 6). Six animals were put into a control group and received no vitamin C. Twelve animals were fed the normal orange juice, and 12 the juice from sprayed trees. Two of the last died within a few days and are not considered in analyzing the results. The average weight changes of the animals in each group are shown in Figure 1, Groups 1, 2 and 3. From this it is apparent that the growth promoting effect of orange juice when it supplements a vitamin C deficient ration is greatly impaired by spraying with lead arsenate.

The animals in Group 1 lived an average of 18 days, ranging from 14 to 22. All of them showed symptoms of scurvy on the 12th day. All except 1 in Group 3 showed some symptoms of scurvy by the 15th day, 2 died, 1 in 20 days, and 1 in 26 days, after the experiment was begun. In Group 2, 4 animals developed scurvy by the 15th day, 1 in 19 days, 5 in 22, 1 in 26, and 1 in 28. There was, therefore, a marked delay in the onset of scurvy in the animals receiving the juice of fruit from unsprayed trees. Autopsy findings were confirmatory of the observations on the living animals. The experiment was discontinued at the end of 7 weeks. All of the animals showed extensive scorbutic lesions, but looseness of the teeth and brittleness of the bones

was considerably more pronounced in Group 3 than in Group 2.

The second experiment was begun 1 month after the first, using the same number of animals and the same orange juice, but  $1\frac{1}{2}$  c.c. of juice were fed daily. The growth response of these animals was distinctly better than with 1 c.c. of juice (Figure I) but growth on the normal juice was superior to that from the sprayed fruit. There was a greater difference with respect to onset of scurvy. The controls, Group 4, developed scurvy in 12 to 15 days and lived an average of 23 days. All the animals receiving the juice from sprayed trees (Group 6) showed some symptoms of scurvy by the 18th day and their condi-

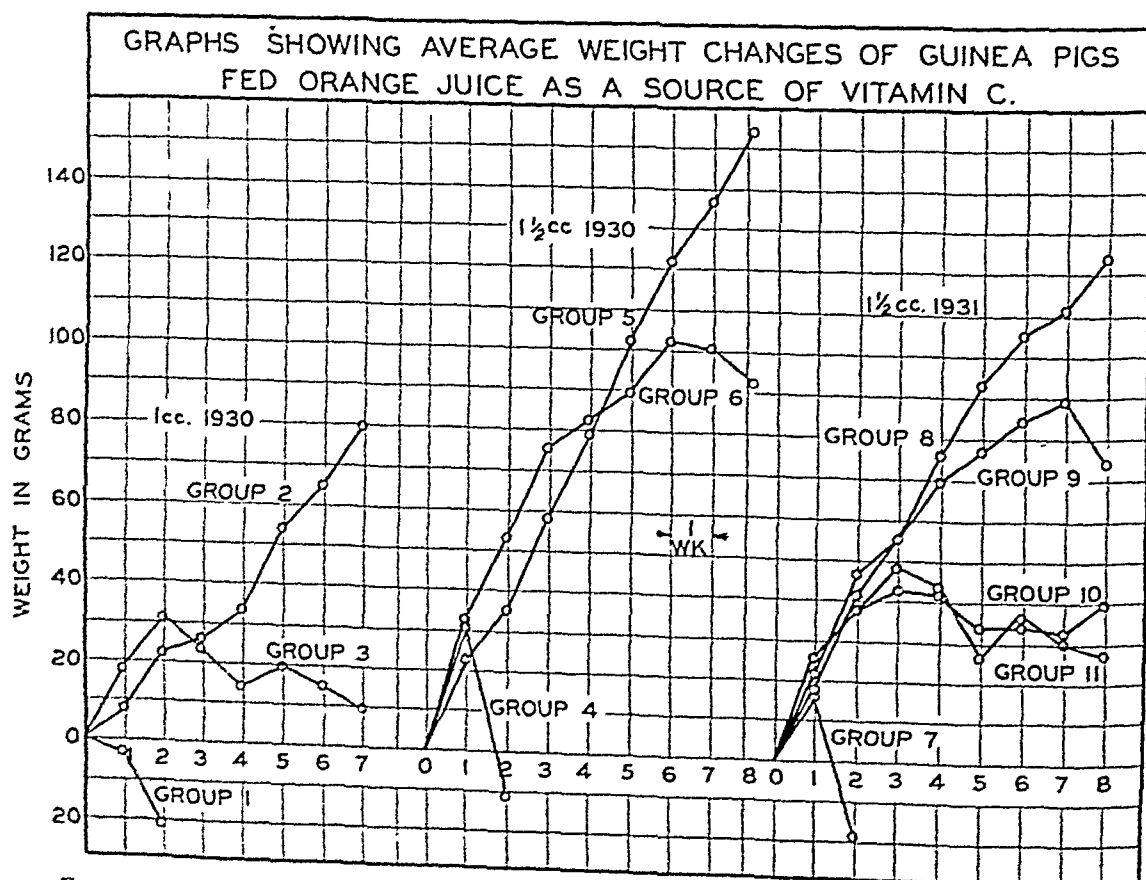


FIGURE I—These graphs show that when guinea pigs are fed orange juice as a sole source of vitamin C the growth response is greatly influenced by the quality of the juice as affected by spraying orange trees with lead arsenate. Group 1 received only the scorbutic ration. Groups 2 and 3 received 1 c.c. of orange juice daily from the fruit of unsprayed (oranges Lots 1 and 2) and heavily sprayed trees (oranges Lots 5 and 6), respectively. There were 6 animals in Group 1, 12 in Group 2, and 10 in Group 3. Groups 4, 5 and 6 are, respectively, duplicates of Groups 1, 2 and 3 with the orange juice fed at a  $1\frac{1}{2}$  c.c. level daily. There were 6 animals in the negative control, Group 4, and 12 in each of Groups 5 and 6. Eight animals were started in each of the remaining groups, but 1 animal in Group 8 and 2 in Group 11 died within a short time and are not included in the compilation of results. Group 7 received no vitamin C. Oranges from trees treated as follows were used in the remaining tests: Group 8, oranges Lot 7 not sprayed. Group 9, oranges Lot 8 medium-sprayed, 1929; no spray, 1930. Group 10, oranges Lot 4 medium-spray, 1929 and 1930. Group 11, oranges Lot 10 heavily sprayed, 1929 and 1930. There was no difference in growth of the animals, depending upon whether the trees had received heavy or medium spray treatment. Some effect of the spray treatment in 1929 was evident even though there was no spray during the year the fruit was grown.

tion remained about the same until the experiment was discontinued at the end of 8 weeks. Only 2 of the animals receiving normal juice (Group 5) developed scurvy, 1 in 17, and 1 in 28 days.

We were interested in any possible detrimental effect of processing mentioned and our investigations were planned to obtain information on this point. In the experiments just described 30 animals were di-

TABLE V  
CHEMICAL ANALYSIS OF HEAVILY SPRAYED FRUIT, NOT PROCESSED  
LOT 5

	Weight of Orange	Volume of Juice	Per Cent Juice	Soluble Solids (Brix)	Acidity as An- hydrous Citric Acid	Ratio Brix Acidity	Per Cent Acid in Fruit	pH Value
As received	gm.	c.c.	%	%	%		%	
	264	137	51.9	9.6	0.24	40.0	0.130	4.9
	216	115	53.2	10.6	0.17	62.4	0.096	5.1
	225	125	55.6	10.3	0.12	85.8	0.072	5.4
	212	118	55.7	10.4	0.12	86.7	0.067	5.6
	220	126	57.3	11.2	0.14	80.0	0.086	5.6
	260	138	53.1	10.3	0.16	64.4	0.090	5.2
	192	100	52.1	11.5	0.14	82.1	0.078	5.3
	207	108	52.2	10.8	0.37	29.2	0.204	4.6
	204	109	53.4	9.8	0.18	54.4	0.101	5.1
	246	127	51.6	9.7	0.57	17.0	0.304	4.1
Average	225	120	53.6	10.4	0.22	60.2	0.123	5.1
After 30 days Storage	211	120	56.9	10.7	0.13	82.3	0.080	5.4
	217	122	56.2	10.7	0.23	46.5	0.135	5.3
	199	119	59.8	10.9	0.12	90.8	0.072	5.5
	235	136	57.9	11.0	0.12	91.7	0.069	5.6
	209	121	57.9	11.0	0.15	73.3	0.093	5.2
	219	129	60.8	11.2	0.10	112.0	0.067	5.7
	220	127	57.7	12.4	0.16	77.5	0.098	5.2
	199	116	58.3	11.7	0.14	83.6	0.087	5.3
	206	128	62.1	11.2	0.10	112.0	0.062	5.7
	202	112	55.4	11.9	0.22	54.1	0.127	5.0
Average	211	123	58.3	11.3	0.14	82.4	0.089	5.4
After 60 days Storage	190	98	51.6	11.9	0.47	25.3	0.253	4.3
	174	102	58.6	12.0	0.16	75.0	0.100	5.0
	198	108	54.5	12.4	0.12	103.0	0.071	5.4
	181	109	60.2	12.0	0.12	100.0	0.078	5.4
	182	113	62.1	11.7	0.10	117.0	0.062	5.6
	174	97	51.7	11.9	0.11	108.0	0.062	5.4
	158	90	57.0	12.4	0.11	113.0	0.080	5.5
	160	96	60.0	12.4	0.10	124.0	0.066	5.6
	157	92	58.6	12.4	0.14	88.6	0.088	5.4
	191	119	62.3	11.6	0.12	96.0	0.081	5.5
Average	177	102	57.7	12.1	0.16	94.9	0.094	5.3



TABLE VI  
CHEMICAL ANALYSIS OF HEAVILY SPRAYED FRUIT, PROCESSED  
LOT 6

	Weight of Orange	Volume of Juice	Per Cent Juice	Soluble Solids (Brix)	Acidity as An- hydrous Citric Acid	Ratio Brix Acidity	Per Cent Acid in Fruit	pH Value
As received	gm.	c.c.	%	%	%		%	
	196	105	53.6	10.1	0.15	67.3	0.086	5.3
	227	135	59.5	10.4	0.12	86.7	0.071	5.7
	173	107	61.8	11.0	0.11	100.0	0.068	5.7
	194	118	60.8	11.5	0.13	88.5	0.085	5.7
	151	92	60.9	12.2	0.14	87.1	0.091	5.4
	196	122	62.2	11.7	0.19	61.2	0.124	5.1
	171	94	55.0	11.6	0.12	96.7	0.072	5.6
	137	89	65.0	11.6	0.10	116.0	0.072	6.2
	156	96	61.5	12.0	0.10	120.0	0.062	6.0
	196	113	57.7	11.2	0.14	80.0	0.087	5.5
Average	180	107	59.8	11.3	0.13	90.3	0.082	5.6
After 30 days Storage	225	116	51.6	11.0	0.18	61.1	0.098	5.3
	207	128	61.8	11.0	0.13	84.6	0.087	5.4
	230	129	56.1	10.4	0.14	74.3	0.084	5.2
	243	146	60.1	10.9	0.19	57.4	0.120	5.1
	266	154	57.9	10.2	0.16	63.8	0.098	5.2
	247	133	53.8	10.4	0.27	38.5	0.151	4.8
	201	119	59.2	11.0	0.24	45.8	0.148	5.0
	224	126	56.3	11.0	0.48	22.9	0.282	4.4
	218	128	58.7	11.0	0.55	20.0	0.335	4.2
	220	130	59.1	10.7	0.18	59.4	0.112	5.1
Average	228	131	57.5	10.8	0.25	52.8	0.152	5.0
After 60 days Storage	216	116	53.7	9.0	0.11	81.8	0.059	5.5
	150	81	54.0	11.8	0.14	84.3	0.081	5.2
	179	108	60.3	11.0	0.11	100.0	0.066	5.5
	175	100	57.1	11.0	0.17	64.7	0.103	5.0
	186	107	57.5	10.2	0.16	63.8	0.098	5.1
	166	100	60.2	10.5	0.16	65.6	0.102	5.2
	155	93	60.0	11.8	0.10	118.0	0.066	5.5
	158	88	55.7	11.6	0.10	116.0	0.061	5.7
	181	99	54.7	11.4	0.11	104.0	0.066	5.5
	166	103	62.0	11.4	0.13	87.7	0.087	5.4
Average	173	100	57.5	11.0	0.13	88.6	0.079	5.4

vided into 5 equal groups. Group 1 received no vitamin C, while the others received orange juice as follows: Group 2, normal oranges, unprocessed; Group 3, normal oranges, processed; Group 4, oranges from heavily sprayed trees, unprocessed; Group 5, oranges from heavily sprayed trees, processed. Processing had no demonstrable effect on vitamin content of oranges irrespective of whether the trees were

sprayed or not. For the purpose of discussing the effects of spraying, the animals have been regrouped without reference to whether the fruit was or was not processed.

The third experiment, carried out in 1931, was designed to obtain more accurate information on the effect of different degrees of spraying on vitamin content of the fruit. Forty animals were divided into 5 equal groups. Group 7 received no vitamin C, and Group 8 received normal orange juice; the remaining received orange juice from trees which had the following treatment: Group 9, no spray in 1930 and medium spray in 1929; Group 10, medium spray in 1929 and 1930; Group 11, heavy spray in 1929 and 1930. The growth of the animals (Figure I) is in fairly good agreement with the chemical findings. The effect of spraying in 1929 is evident though there was no spraying

TABLE VII  
SUGAR DETERMINATIONS  
LOTS 1 TO 6

	Sucrose	Invert Sugar	Ratio Sucrose Total Sugar	Acidity as An- hydrous Citric Acid	pH Value
Lot 1					
As received.....	5.24	4.26	0.552	0.94	3.6
After 30 days.....	5.66	4.68	0.547	0.95	3.8
After 60 days.....	5.51	4.78	0.535	0.98	3.7
Lot 2					
As received.....	5.20	4.45	0.539	0.96	3.7
After 30 days.....	5.54	3.97	0.583	0.78	3.9
After 60 days.....	5.70	4.05	0.585	0.73	3.9
Lot 3					
As received.....	4.99	4.74	0.513	0.23	5.1
After 30 days.....	4.26	5.71	0.427	0.32	4.7
After 60 days.....	3.55	6.84	0.342	0.18	5.0
Lot 4					
As received.....	5.13	5.04	0.504	0.28	4.8
After 30 days.....	4.16	5.68	0.423	0.23	5.0
After 60 days.....	4.05	5.25	0.425	0.18	5.0
Lot 5					
As received.....	4.04	5.03	0.445	0.22	5.1
After 30 days.....	3.53	6.56	0.350	0.14	5.4
After 60 days.....	3.08	7.42	0.293	0.16	5.3
Lot 6					
As received.....	3.75	6.05	0.383	0.13	5.6
After 30 days.....	4.53	4.99	0.476	0.25	5.0
After 60 days.....	3.41	6.36	0.349	0.13	5.4

TABLE VIII  
CHEMICAL ANALYSES OF ORANGES  
LOTS 7 TO 10

	Soluble Solids (Brix)	Acidity as Anhydrous Citric Acid	Ratio Brix Acidity	pH Value	Sucrose gm. per 100 c.c.	Invert Sugar gm. per 100 c.c.	Ratio Sucrose Total Sugar
Lot 7 Normal fruit, unsprayed.....	% 11.9	% 1.02	11.7	3.6	5.03	4.84	0.520
Lot 8 Medium spray, 1929; No spray, 1930.....	13.3	0.89	14.9	3.8	6.06	5.87	0.508
Lot 9 Medium spray, 1929 and 1930 ..	13.2	0.55	24.0	4.3	5.70	6.40	0.471
Lot 10 Heavy spray, 1929 and 1930..	12.4	0.26	47.7	4.9	4.46	6.90	0.393

the year the fruit matured. There was no demonstrable difference between the fruit from medium and heavily sprayed trees. The negative control group developed scurvy in an average of 14 days and survived an average of 22 days. No scurvy was observed in Groups 8 and 9 and only slight evidence of it was revealed by autopsy. There were 2 cases of marked scurvy in Lot 11, 1 in 28 and 1 in 42 days. There were 4 deaths in Group 10 after the 5th week. All of the animals in Groups 10 and 11 showed extensive lesions of scurvy upon autopsy.

#### DISCUSSION

The ratio, Brix to acidity, is used in determining the degree of maturity of citrus fruits intended for interstate shipment. By means of the Brix spindle the total soluble solids of the juice are determined. Acidity is calculated as anhydrous citric acid from the titrable acidity. The Brix acidity ratio is obtained by dividing the percentage of total soluble solids by the percentage of citric acid. The value of this ratio increases as the ripening of the fruit progresses. The minimum values set by maturity standards based on this ratio are reached earlier by the use of arsenical sprays. This fact has been taken advantage of

by unscrupulous fruit growers to market their fruit early in the season when better prices may be obtained.

It seems desirable to make it clear that there is little danger of consumption of arsenic when eating fruit from sprayed trees. Furthermore, citrus fruits normally receive a cleansing treatment before being placed on the market. While this might not remove all the residue in the pores of the peel, the remainder would be discarded with the peel or in extracting the juice. There is no detectable increase in arsenic in the juice or pulp of oranges from sprayed trees over that found in those from unsprayed trees.

The changes in chemical composition of oranges due to spraying assume greater significance in the light of the low vitamin content of such fruit since the chemical changes involved may be much more extensive than those recorded to date. The changes known to take place in citric acid and in sugar content do not alter appreciably the nutritive value of the fruit. However, oranges are a very important source of vitamin C and the decrease in this factor is worthy of serious consideration. Fortunately, both California and Florida have laws preventing the use of arsenical sprays on citrus fruits. These laws were designed to protect the citrus fruit industry by preventing the sale of immature fruit that meet the standard necessary for interstate shipment. Our findings on the lessened nutritive value of sprayed oranges now add an important additional reason for the enforcement of these laws.

These investigations indicate that the Brix acidity ratio can be used to indicate low vitamin C content of orange juice. Further study should be made to determine to what extent the high Brix acidity ratio can be correlated with low vitamin C content. We conclude from the experiments that have been completed that the vitamin C content of heavily sprayed oranges is decreased fully one-third and it may be only one-half of that of unsprayed fruit.

Owing to the widespread use of arsenical sprays to combat insect pests, the observation that lead arsenate adversely affects the vitamin C content of oranges opens up a new field of investigations. Additional studies involving the effects of various sprays upon the vitamin content of fruits and vegetables are being planned.

#### SUMMARY

Data are presented to show that oranges produced by trees sprayed with lead arsenate differ in chemical composition from normal oranges. The most pronounced difference is a reduction in acidity of the juice; there is also a decrease in sucrose with a corresponding increase in invert sugar.

The arsenic content of the edible portion of the orange was not changed by spraying the tree with heavy doses of lead arsenate.

The vitamin C content of oranges from trees sprayed with lead arsenate was found to be considerably lower than that of oranges from unsprayed trees of the same variety and the same degree of maturity.

The processing of oranges as practised by Plant Quarantine and Control Administration to destroy larvae of the Mediterranean fruit fly did not change the character of the sugars, citric acid or vitamin C content of the fruit.

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Washington Cathedral, located on Mount Saint Alban, at an elevation of 400 feet above the Potomac River

# Public Health Aspects of Frozen Foods\*

CARL R. FELLERS, PH. D., F. A. P. H. A. (*Life Member*)

*Massachusetts State College, Amherst, Mass.*

THE phenomenal growth of the frozen food industry in the United States and the British Empire during the past few years may well cause public health officials to inquire into its public health aspects. Statistics for 1930 show a production in the United States of 320,000,000 gal. of ice cream, 77,000,000 lb. of poultry, 30,000,000 lb. of strawberries, 100,000,000 lb. of fish, and correspondingly huge quantities of meats, fruits, and other products. That the industry will grow in the future is certain. At present we are in a stage of flux and experimentation. New products are being frozen, new and improved equipment and processes are being developed, and the thermodynamics and mechanical phases of freezing are becoming better understood.

Freezing as a means of preserving perishable food is not new. The Greeks and Romans were thoroughly acquainted with the preserving action of cold. As long ago as 1860 in Australia, Morris and Mort<sup>1</sup> are said to have been the first to freeze successfully and export beef and mutton to England. Piper<sup>2</sup> in Maine was the pioneer in commercial fish freezing in 1861. Similarly, frozen eggs and poultry have been staple commodities since before 1900. The addition of fruits, filleted fish, meat cuts, and vegetables to the list of frozen foods is much more recent. Though packed experimentally in 1912, fruits were first frozen commercially in the Pacific Northwest about 1918.<sup>3</sup> The production of all varieties of frozen berries, peaches and cherries has reached tremendous totals comprising a considerable percentage of the crop. It cannot be said even now that frozen vegetables are commercially successful. The successful launching of new foods depends upon research, advertising, and the repeat orders of the consumer.

The food habits of a nation cannot be changed overnight. Frozen foods must compete with fresh grown, shipped-in, canned, dried, salted, and smoked products. The capacity of the human stomach does not change. When we eat frozen fish, we buy less fresh fish. In time the

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public will learn which foods are best canned, which are best frozen or otherwise preserved. It is almost axiomatic that no preserved foods will wholly substitute for the fresh, though for the sake of convenience, dietary variety, and nutritional balance, they will always find a ready market. It is certain that the public will prefer frozen perishable foods of good quality if the cost is reasonable, to low quality or unattractive fresh foods.

The economic advantages of frozen foods should be briefly mentioned. Especially such perishable ones as fish, meats, and fruits are prepared at central points where available. Waste and inedible parts are removed. Transportation charges are less and the foods do not deteriorate greatly in storage. Freezing utilizes perishable crops, stabilizes industry, prevents waste, and facilitates marketing. Frozen foods are convenient to handle, require little space and make an attractive display. The shopkeeper likes them because he can readily figure his profit as in other packaged goods. Optimists in the industry predict that the time is not far distant when a large percentage of the 400,000 grocery stores in the country will handle packaged foods.

#### GENERAL HEALTH ASPECTS

In what ways can this huge new industry affect the public health? The following factors seem to have some bearing on the question.

1. Sanitation and working conditions at the freezing plants
2. Freshness and soundness of raw materials
3. Effectiveness of the process, its controllability and dependability
4. Effect of freezing and storage on quality, chemical, and nutritive values
5. How does freezing and storage affect bacterial population of the food?
6. What happens when frozen foods are thawed and how long after defrosting do they remain safe to eat?

#### SANITATION AND WORKING CONDITIONS

The writer has had the opportunity of inspecting a considerable number of freezers for the handling of meats, fish, poultry, fruit, in plants located in the East, West, and South. With very few exceptions, there are only minor sanitary problems. Since nearly all freezers are located in cities, modern plumbing and sewage disposal systems are available. In general, fish, meats, and poultry are prepared for freezing in clean surroundings.

Birdseye,<sup>2</sup> and Tressler,<sup>4</sup> have described the really excellent sanitary measures which have been adopted by some of the largest plants. Their investigations showed a progressive reduction in bacterial numbers as the fish were washed, skinned, filleted, and packaged for freezing. Titman<sup>5</sup> also described the effective sanitary measures in use in

modern egg freezing plants. Ample clean water is usually at hand, while fairly good lighting and ventilation systems are the rule.

The use of chlorine and hypochlorite in the washing waters and brines in some plants is a highly commendable practice. Because of the fact that foods to be frozen are often kept many months before being sold and consumed, the quality of the raw material is carefully watched. It is thoroughly understood by the trade that poor quality, or semi-spoiled fish, poultry, fruit or eggs cannot be improved by freezing. In fact, operators recognize that the quality of such foods is very likely to become poorer during freezing storage and sometimes they become tainted and unfit for human consumption when thawed out. The activity of the federal and state food officials in carefully inspecting frozen foods, both at the time of packing and while in storage, also acts as a strong deterrent against the use of poor quality raw products.

Working conditions in the plants compare favorably with those in other industrial establishments such as canneries. Limited data collected at several cold storage or freezing plants do not show any greater incidence of respiratory disease among workers than is normal for the community. I believe we can truthfully state that plant sanitary standards are relatively high. One reason for this is that many owners and operators of freezers are unusually progressive, intelligent, and public minded.

#### RAW MATERIALS

The absolute necessity of using only first quality raw products for freezing is fully recognized. Formerly, unscrupulous dealers sometimes resorted to freezing poultry, fish, or meat which was in an incipient stage of decomposition, but repeated losses, frequent seizures by the state and federal officials, and a general lack of interest in such foods by the trade, have caused this shady practice to be abandoned.

To more than any other single factor, the general lack of public faith in frozen foods has been due to their uncertain quality. It has been a hard fight to persuade the people that frozen meats, fish, eggs, poultry, fruits, and vegetables can be nearly as attractive and fully as sound, palatable, and nutritious as when fresh. In justice to modern progressive operators, much praise must be given them for the extreme care they are now taking to guard the high grade and soundness of their packs.

In the freezing of foods there is no excuse for delay, which brings on deteriorative changes. Berries must be free from mold, fermentation, and dirt. Fish and other marine products must be thoroughly cleaned, uncontaminated with fecal bacteria, and free from odor or



even incipient spoilage. Meats must be subjected to the usual federal inspection for evidence of disease or other conditions which might render them unfit for human consumption.

Some municipalities require inspection of poultry as well as meats. Some years ago in the Pacific Northwest it was customary to freeze lower grades and soft berries that could not be marketed fresh or sold to the canneries. Is it any wonder that frozen pack fruit bore a poor reputation? It can now be said that at least average quality raw products are used for the modern frozen pack of all foods.

#### EFFECTIVENESS AND DEPENDABILITY OF FREEZING

It is outside the province of this paper to discuss the relative merits of various freezing systems or methods. Several commercial processes now in use are strictly dependable and effective. We hear a great deal about "quick-freezing." This catchword has been over-emphasized. To the layman it means some special new method, by which the food is frozen in a few seconds or minutes at most. The truth is that many successful methods are being used to freeze foods with reasonable rapidity, but even the so-called "quick-frozen" foods, in very small packages or cartons, require an hour or more. No satisfactory methods of freezing large quantities or pieces, such as carcasses of beef, have been devised.

There is a growing tendency to freeze at lower temperatures than formerly. The usual range for rapid freezing is from 0 to 40° below zero F. Since most foods contain from 70 to 95 per cent of water, they begin to freeze at about 32 to 25° F. In lowering the temperature from 32° to 15° F., about 85 per cent of the water of a food crystallizes as ice; at 0° F. approximately 95 per cent of the water is frozen. When water separates as ice there is a gradual increase in concentration of the remaining liquid. This renders freezing increasingly difficult as the amount of free moisture diminishes. Complete freezing of the water takes place at temperatures of 60 to 100° below zero F. in most foods.

Slow freezing in air produces slow growing, large ice crystals in the intercellular spaces. Sharp or rapid freezing of flesh foods produces crystals only in the muscle fibers themselves and not in the intercellular spaces. Such foods thus retain their former appearance upon thawing.

Planck, Ehrenbaum and Reuter<sup>\*</sup> in 1916, conducted some of the first experimental work on the effect of freezing on foods, especially fish. They conclusively demonstrated the greater efficacy and desirability of rapid freezing at low temperatures in so far as the physical, histological, and chemical character of the frozen or thawed product

was concerned, and showed the necessity of a controlled, even, low storage temperature in order to avoid deteriorative changes. A good summary of the changes occurring during freezing and thawing is given by Glennie<sup>7</sup> and Planck.<sup>8</sup>

It is untrue that large ice crystals formed in slow freezing are the main cause of the exudation or "drip" of juice in frozen flesh foods. Though laceration of the cells may occur, this is not the primary cause of leakage, notwithstanding popular opinion to the contrary. Leakage or drip in frozen foods causes the loss of valuable extractives and salts, and should be eliminated if possible. The cause is a more or less irreversible flocculation or coagulation of colloidal gels of which cells and protoplasm consist. Modern methods of rapid freezing have been developed which largely prevent leakage in meat and fish upon thawing. Leakage in plant products, however, cannot be overcome because of fundamental differences in the composition and gel structure of the plant cell.

The cell contents of both plants and animals consist of a colloidal gel containing proteins, salts and water. When the water is frozen the gel structure or network is broken down. In the case of flesh, the colloidal gel structure is largely reversible and when frozen meats or fish are thawed, the cells reabsorb most of the water. That is, flesh foods retain their structure and texture better than plants. The cell walls of flesh are highly elastic; those of plants are composed of cellulose and pectins and are inelastic. In fruits and vegetables the gel being irreversible, cell walls rupture, water is not reabsorbed after thawing, and the fruit or vegetable loses its turgidity and original firm structure. For full discussions of the physical effects of freezing tissue see Taylor,<sup>9</sup> Birdseye,<sup>10</sup> Woodruff,<sup>11</sup> Magoon,<sup>12</sup> and Joslyn.<sup>13</sup> The addition of sugar to fruits greatly aids in preserving the original characteristic flavor and color. Diehl,<sup>14</sup> Fellers and Mack,<sup>15</sup> Joslyn and Cruess,<sup>16</sup> and Woodroof<sup>17</sup> have investigated the freezing of fruits with and without sugar for use in ice cream, jams, juices, and for table consumption. While fruits were originally frozen exclusively in 50 gallon barrels, the use of smaller containers suitable for the retail trade, such as hermetically sealed and slip-on covered tin cans, glass jars, waxed paper cups, and cartons, and cellophane packages for a wide variety of products is increasing.<sup>10, 17, 18, 19, 20</sup>

It has been proved that frozen foods dry out considerably and lose weight during storage.<sup>20</sup> There is also a tendency for fats to oxidize and become rancid and for "rusting" to occur. This "rusting" has been shown by Taylor<sup>21</sup> to result from a change of hemoglobin to methemoglobin. Enzymic oxidations sometimes produce surface dis-